WY-60 Reference Guide



WYSE

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WY-60 REFERENCE GUIDE

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OVERVIEW

This reference guide presents the basic information you'll need to operate this versatile, full-function ASCII terminal and take advantage of its advanced display, communications, and keyboard features:

- Choice of keyboards, all with full-touch keycaps and programmable function and editing keys.
- Up to seven pages of display memory. Choice of 26- or 44-line by 80- or 132-column display, with split screen capability and selectable status lines.
- Hidden character display attributes that can be combined with double-high/double-wide line attributes; nonhidden attribute modes.
- Seven predefined character sets, 512 user-definable characters.
- Fifteen operating modes with personalities characteristic of other terminals, including PC and PC/AT terminal modes.
- Bidirectional, interchangeable communications interfaces.
- Wyseworks desktop accessories.
- Wyseword enhancement for WordStar word processing.

Chapters 1 through 3 tell you how to install and configure the terminal and describe the terminal's communication modes and keyboard controls.

Chapter 4 offers some simple solutions for suspected operating problems.

Chapter 5 tells you how to take advantage of the terminal's programmable features in your computer programs.

Chapter 6 describes the character sets and the procedure for designing your own characters.

Specifications and detailed technical information are provided in the appendixes.

In this guide, information on the terminal's other personalities assumes some operating knowledge of the corresponding terminals. For further information, refer to the terminal manufacturer's published documentation.

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GLOSSARY

ASCII Acronym for American Standard Code for Information Interchange. A standardized code for digital communication between devices of different manufacturers, consisting of 7-bit control and alphanumeric characters.

break An interruption of transmission in which the transmit line is brought to a space condition.

character set A particular grouping of the total characters available to the terminal for display on the screen.

configuration A particular functional arrangement of the terminal's operating characteristics.

CTS Acronym for Clear to Send line, which signals the terminal that the attached device is ready to receive more data.

data port The port through which data is transmitted between the terminal and a computer or modem. Either one of the terminal's two ports can serve as the data port.

DCE Acronym for Data Communications Equipment, typically a computer or modem.

display attribute A visual characteristic of what is displayed on the screen, such as the blinking or dimming of characters.

DSR Acronym for Data Set Ready line. By raising or lowering the DSR line's voltage, the terminal tells the attached device whether it's ready to receive data.

DTE Acronym for Data Terminal Equipment, typically a terminal or printer.

DTR Acronym for Data Terminal Ready line. By raising or lowering the DTR line's voltage, the terminal tells the attached device whether it's ready to receive data.

error code A code that appears at the bottom right of the screen to indicate a problem uncovered during the terminal's self-test.

font Characters of a particular size and style stored in the terminal's memory.

font bank A storage area holding one of four character sets ready to be activated for display.

native mode The mode in which the terminal normally operates and which has the most functions available. See also "personality."

nonvolatile memory A permanent memory storage area not affected by the terminal's loss of power.

personality A mode of terminal operation characteristic of one or more other terminals.

port The communications interface where data is sent and received by the terminal or other communicating device. The terminal has two ports, labeled "MODEM" and "AUX."

printer port The port through which data is transmitted between the terminal and an attached printer. Either one of the terminal's two ports can serve as the printer port.

RTS Acronym for Request to Send line, which signals the attached device that the terminal is ready to send more data.

1 INSTALLING THE TERMINAL

Getting Ready 1-1

Connecting the Terminal 1-1

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Adjusting the Terminal 1-3

GETTING READY

You'll need a shielded serial interface cable (fitted with a male 25-pin connector on the terminal end) to connect the terminal to your computer or modem. If you plan to connect a serial printer directly to the terminal, you'll need a second serial cable. (See Appendix B for connector pin assignments.)

Place the terminal on a flat, hard surface, allowing three inches on all sides for ventilation.

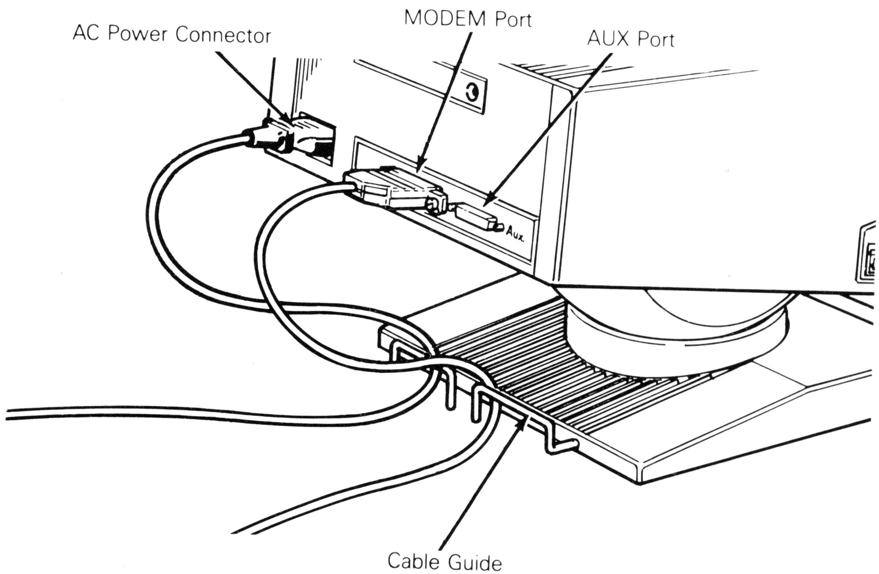
CONNECTING THE TERMINAL

1. Press the front half of the power switch on the right side of the terminal to be sure that the terminal is turned off.

2. Plug the keyboard cable into the keyboard socket on the left side of the terminal.

3. Thread the serial cable(s) through the cable guide at the back of the terminal base (Figure 1-1).

Figure 1-1 Back Panel Connections



4. Connect the computer cable to the MODEM port and to your computer or modem. (To connect a printer to the terminal, connect the printer cable to the AUX port.)

5. Plug the power cord into the terminal's power connector and into a three-pronged grounded power outlet. (If you use an adapter, be sure to ground the outlet.)

   Note--Make sure your building's voltage (115 in the U.S.) matches the voltage shown on the back of the terminal.

TURNING ON THE TERMINAL

After the terminal is installed, turn it on and listen for an immediate beep indicating that it has received power. The screen may flash display patterns as the terminal tests itself for a few seconds. When you see the cursor in the upper left corner of the screen, the terminal has passed all its tests and is ready for operation.

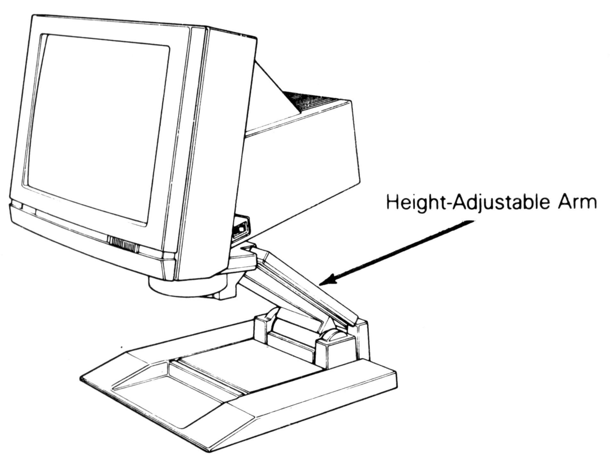
If the terminal uncovers a problem during the test, a bell sounds and an error code appears in the bottom right corner of the screen. If this happens, refer to Chapter 4, "Troubleshooting."

ADJUSTING THE TERMINAL

The center of the terminal screen should be slightly below your eye level. Adjust the screen's brightness with the slideswitch at the right front corner. If you want the keyboard slanted up slightly, turn it over and pull out the hinged foot.

You can order the height-adjustable arm shown in Figure 1-2.

Figure 1-2 Height-Adjustable Arm



2 CONFIGURING THE TERMINAL

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This chapter tells how to configure the terminal's operating parameters in setup mode and redefine the terminal's programmable keys.

ENTERING AND LEAVING SETUP MODE

Caution--Don't enter setup mode while data is being transmitted between the terminal and the computer. The terminal can't receive data in setup mode.

To enter setup mode, press the SHIFT and SETUP keys simultaneously. Data on the screen disappears, and the "top setup level" menu appears; the data is restored when the terminal returns to normal operating mode.

Note--On the AT-style keyboard, press the SHIFT and SYS REQ keys to enter setup mode. On the PC-style keyboard, press the SHIFT and SCROLL LOCK keys.

Top Setup Level Menu

The top level menu presents choices for displaying other setup level menus and for leaving setup mode:

- The fields at the top of the screen show the alternatives for saving parameter changes in nonvolatile memory and returning to the normal operating mode. Table 2-1 describes these alternatives.
- The second line identifies the keys that you press to select the fields shown on the menu and activate their functions.
- The fields at the bottom of the screen identify the setup levels where you can change the terminal's operating parameters.

Press the F10 key to leave setup mode.

Table 2-1 Top Level Exit Functions

Field	**Function**
EXIT	Returns the terminal to normal operating mode without saving parameter changes
SAVE MODES	Saves only operating parameter changes and returns the terminal to normal operating mode
SAVE ALL	Saves operating parameter changes, key redefinitions, and function key labels, and returns the terminal to normal operating mode
DEFAULT ALL	Restores all operating parameters and key definitions to their default values and highlights the EXIT field. The default settings are not saved until you select the SAVE ALL option.

Table 2-1 Continued

Field	Function
RECALL	Restores all parameters to the selections last saved in nonvolatile memory and highlights the EXIT field. The previous selections are saved when the terminal returns to normal operating mode.

CHANGING THE OPERATING PARAMETERS

Press the function keys to select the functional setup levels indicated on the bottom line:

- Once you've selected one of these levels, its field is highlighted.
- The fields that appear in the middle of the screen identify the parameters you can define in that level, and their current settings.
- The top line identifies the keys you press to highlight the parameter fields and change the settings. Pressing the F10 key always returns you to the top level.

Parameter Settings

This section lists all the parameters in alphabetical order and explains their settings. The terminal's default settings are always listed first under each parameter.

Note--Explanations of setup parameters apply to the terminal's native mode. If you select a parameter setting that's invalid for the operating mode (personality) the terminal is in, the terminal will default to a valid setting upon leaving setup mode.

ATTRIBUTE

CHAR	Display attributes are assigned to each character as it is entered.
LINE	Display attributes are active to the end of the cursor line.
PAGE	Display attributes are active to the end of the page.

AUTOPAGE

OFF	When the cursor reaches the top or bottom of the page, it wraps on the page or the data scrolls, depending on the AUTOSCRL setting.
ON	When the cursor reaches the top or bottom of the page, a new page of memory moves onto the screen.

AUTOSCRL

ON	When the cursor moves past the last line of the page, the data scrolls up one line.
OFF	When the cursor moves past the last line of the page, it returns to the top of the same page.

BACKGROUND

DARK	Screen displays light characters on a dark background.
LIGHT	Screen displays dark characters on a light background.

BAUD RATE — Sets MODEM or AUX port baud rate.

MODEM Port	AUX Port
9600	9600
19200	19200
38400	110
50	134.5
75	150
110	300
134.5	600
150	1200
300	1800
600	2000
1200	2400
1800	3600
2000	4800
2400	7200
4800	

BLOCK END — (When this parameter's setting is changed, the VP60 BLK END parameter also changes.)

- US/CR — Block mode line terminator is ASCII US; block terminator is CR.
- CRLF/ETX — Block mode line terminators are ASCII CR and LF; block terminator is ETX.
- IBM:XOFF, IBM:EOT — These line terminator selections apply only to IBM personalities (see Appendix F).

BREAK

250ms	The terminal sends a break signal for 250 milliseconds.
170ms	Break is 170 milliseconds.
500ms	Break is 500 milliseconds.

COLUMNS

80	Terminal displays 80 columns.
132	Terminal displays 132 columns.
Econ-80	Terminal locks into 80-column format to give more pages of memory--see "Defining the Data Area" in Chapter 5. **Caution**--When you change to or from economy 80-column mode, the terminal clears the entire display memory (including the status line) as soon as you leave setup mode.

COMM MODE

FULL DUPLEX	Communication mode is full duplex.
BLOCK	Communication mode is block.
HALF DUPLEX	Communication mode is half duplex.
HALF BLOCK	Communication mode is half-duplex block.

CORNER KEY	(The corner key is the key labeled FUNCT, HOLD, or SCROLL LOCK, depending on your keyboard.)
FUNCT	When pressed with an alphanumeric key, the corner key sends an ASCII SOH, the other key's code, and an ASCII CR.
HOLD	Pressing the corner key freezes the current data on the screen until the key is pressed again.
CURSOR	
BLINK BLOCK	Cursor is a blinking rectangle.
STEADY BLOCK	Cursor is a steady rectangle.
BLINK LINE	Cursor is a blinking underline.
STEADY LINE	Cursor is a steady underline.
DATA BITS	(MODEM or AUX port)
8	Port sends and receives only 8-bit data.
7	Port sends and receives only 7-bit data.
DATA/PNTR	
MODEM/AUX	MODEM port is the data port, communicating with the computer; AUX port is the printer port.
AUX/MODEM	AUX port is the data port; MODEM port is the printer port.

END-OF-LINE WRAP

ON	When the cursor reaches the end of a line, it wraps to the start of the next line.
OFF	When the cursor reaches the end of a line, additional characters entered replace the character at the cursor position.

ENHANCE

ON	Terminal recognizes additional commands in the nonnative terminal personalities.
OFF	Terminal does not recognize an enhanced set of codes.

ENTER

CR	ENTER key sends an ASCII CR (carriage return).
CR,LF	ENTER key sends an ASCII CR and LF (carriage return, linefeed).
TAB	ENTER key sends an ASCII HT (horizontal tab).
IBM:SEND	Applies only to IBM personalities (see Appendix F).

FKEY XMT LIMIT

NONE	Terminal sends function key definitions as fast as the baud rate allows.
60cps	Terminal sends function key definitions at a maximum rate of 60 characters per second.

150cps	Terminal sends function key definitions at a maximum rate of 150 characters per second.

FONT LOAD

ON	Terminal automatically loads the appropriate character set for the selected personality and number of lines displayed.
OFF	Terminal doesn't change the character set when changing personality or lines displayed.

KEYCLICK

ON	A muted beep sounds each time a key is pressed or repeated.
OFF	No beep sounds when a key is pressed or repeated.

KEYLOCK

CAPS	When CAPS LOCK key is engaged, alphabetic keys generate only uppercase characters.
REV	When CAPS LOCK key is engaged, the action of the SHIFT key is reversed: Shifted alphabetic keys generate lowercase characters; unshifted keys generate uppercase characters.

KEY REPEAT

ON	Keys repeat when held down for more than half a second.
OFF	Keys don't repeat when held down.

LABELS

OFF	Function key labels are not displayed.
ON	Function key labels are displayed on the bottom line of the screen.

LANGUAGE

US UK DANISH GERMAN FRENCH INTL SPANISH	Choose the setting that matches your keyboard language.

LINES

24	Terminal displays 24 data lines, a status line, and a label line.
25	Terminal displays 25 data lines and a status line.
42	Terminal displays 42 data lines, a status line, and a label line.
43	Terminal displays 43 data lines and a status line.

MARGIN BELL

OFF	Margin bell doesn't ring.
ON	Bell rings eight columns from right margin.

MONITOR	(See Appendix G for the symbols displayed in monitor mode in the terminal's native mode.)
OFF	Terminal executes escape sequences and control codes.
ON	Terminal displays symbols for escape sequences and control codes without acting on them.

NULL SUPPR	(Applies only to IBM personalities; see Appendix F.)
OFF	
ON	

PAGE EDIT

OFF	Editing functions affect the cursor line.
ON	Editing functions affect the entire page.

PAGE LENGTH

1 x LINES	Page length corresponds to the number of lines selected in the LINES parameter.
2 x LINES	Page length is two times LINES.

4 x LINES	Page length is four times LINES (available only in 50+ personality).
*	One page is equal to LINES. A second page contains the rest of the lines remaining in memory.

PARITY	(MODEM or AUX port. The terminal ignores any incoming parity bits.)
NONE	Terminal doesn't add or check for a parity bit.
ODD	Terminal sends data with odd parity.
MARK	Terminal sends a mark (high) parity bit.
EVEN	Terminal sends data with even parity.

PERSONALITY	(When you select a new terminal personality, the terminal displays the appropriate character set unless the FONT LOAD parameter is set to OFF.) **Caution**--The terminal may clear the display memory when changing personalities.
WY 60	Terminal's native mode.
WY 50+	Terminal can run programs written for the WY-50, WY-50+, and WY-100 terminals.
TVI 912/920 TVI 910+ TVI 925 TVI 950 TVI 955	Terminal can run programs written for the indicated TeleVideo terminals.

PC TERM	Terminal can run programs written for PC-type terminals.
AT TERM	Terminal can run programs written for PC/AT-type terminals.
ADDS A2 ADDS VP60	Terminal can run programs written for the indicated ADDS Viewpoint terminals.
HZ 1500	Terminal can run programs written for the Hazeltine 1500 terminal.
DG 200	Terminal can run programs written for the Data General DASHER D100 and D200 terminals.
ADM-31	Terminal can run programs written for the Lear Siegler ADM 31, 3A, and 5 terminals.
IBM 3101-1X IBM 3101-2X	Terminal can run programs written for the indicated IBM terminals.

RCV HANDSHAKE (MODEM port)

NONE	Terminal sends no handshaking signals.
XON/XOFF	Terminal controls receipt of data by sending X-on/X-off characters.
DTR	Terminal controls the receipt of data by raising and lowering the DTR line voltage.
BOTH	Terminal controls the receipt of data by both X-on/X-off and DTR handshaking signals.

RCV HANDSHAKE (AUX port)

DSR	Terminal controls receipt of data by raising and lowering the DSR line voltage.
BOTH	Terminal controls receipt of data by both X-on/X-off and DSR handshaking.
NONE	Terminal sends no handshaking signals.
XON/XOFF	Terminal controls receipt of data by sending X-on/X-off characters.

RCVD CR

CR	When the terminal receives an ASCII CR, the cursor returns to the beginning of the current line.
CRLF	When the terminal receives an ASCII CR, the cursor moves to the beginning of the next line.

RETURN

CR	RETURN key sends a carriage return code.
CR,LF	RETURN key sends a carriage return and a linefeed code.
TAB	RETURN key sends a tab code.

SCRL SPEED (If you choose smooth scrolling, you must select some type of receive handshaking for the data port.)

JUMP	Screen displays data at the rate it's received.

SMOOTH-8	Screen scrolls eight lines per second.
SMOOTH-4	Screen scrolls four lines per second.
SMOOTH-2	Screen scrolls two lines per second.
SMOOTH-1	Screen scrolls one line per second.

SCRN SAVER

ON	Screen saver feature is on. If the terminal receives no data for approximately 15 minutes, the screen blanks until you press a key. No data is lost.
OFF	Data on the screen is always displayed.

SEND (Applies only to IBM personalities; see Appendix F.)

PAGE
LINE

SEND ACK

ON	Terminal sends an ASCII ACK character after executing certain commands. (See "Communicating with the Computer" in Chapter 5.)
OFF	Terminal doesn't send the ACK character.

STATUS LINE

STANDARD	Terminal displays a status line with time and cursor line and column indicators.

EXTENDED	Terminal displays a status line with editing status messages in place of time and line/column indicators.
OFF	Status line isn't displayed.

STOP BITS	(MODEM or AUX port)
1	Terminal sends one stop bit at the end of each data byte.
2	Terminal sends two stop bits at the end of each data byte.

TEST

OFF	Terminal is ready for normal operation.
ON	Don't select this value--it prepares the terminal for a manufacturing self-test.

TVI 955 ATTRIBUTE

SPACE NO SPACE	(These selections apply only to TVI 955 mode; see Appendix F.)

VP60 BLK END	(When this parameter's setting is changed, the BLOCK END parameter setting also changes.)
NONE CR CR, EOT CR, ETX	These selections apply only to the ADDS VP-60 personality (see Appendix F).

WPRT INTENSITY

DIM	Write-protected characters appear dim.
NORMAL	Write-protected characters appear normal.
INVISIBLE	Write-protected characters are invisible.

WPRT REVERSE

OFF	Write-protected characters appear as light characters on a dark background.
ON	Write-protected characters appear as dark characters on a light background.

WPRT UNDERLINE

OFF	Write-protected characters are not underlined.
ON	Write-protected characters are underlined.

WYSEWORD

OFF	Keys send standard key codes.
ON	Specified keys send codes for WordStar functions.

XMT HANDSHAKE (MODEM or AUX port)

NONE	Terminal ignores all handshaking signals.
XON/XOFF	Terminal sends data in response to X-on/X-off characters from attached devices.

XMT LIMIT	(This parameter doesn't apply to function key data--see FKEY XMT LIMIT parameter.
NONE	Terminal sends data as fast as the baud rate allows.
60cps	Terminal sends data at a maximum rate of 60 characters per second.
150cps	Terminal sends data at a maximum rate of 150 characters per second.

REDEFINING THE KEYS

You can redefine the function keys and editing keys, both unshifted and shifted, to send a unique character string of up to 64 characters. You can also redefine the "direction" of the keys as follows:

Remote	Data is sent to the computer only, regardless of what communication mode the terminal is in.
Local	Data is sent to the terminal only, regardless of what communication mode the terminal is in.
Normal	Data is sent to the computer and/or the terminal, depending on the communication mode.

The direction of all the keys is "normal" until redefined.

Memory Space

To save key definitions in nonvolatile memory, choose the SAVE ALL option to exit setup mode. The key definitions share a total of approximately 350 bytes of nonvolatile memory space with the function key labels. If you enter more than 64 characters for

any one key, or reach the 350-character overall limit, you'll hear a warning beep and won't be able to enter more characters.

Note--If you connect another keyboard to the terminal after you've saved key definitions in nonvolatile memory, clear the definitions to their default values.

Keys Setup Menu

To redefine a key, refer to the functions indicated at the top of the keys setup menu and follow these steps:

1. To select the key, press that key together with the CTRL key to highlight the key's direction and definition fields.

2. Press the CURSOR UP or CURSOR DOWN key to select the unshifted or shifted key field.

3. If you want to change the key's direction, press the ENTER key until your choice appears: normal, remote, local.

4. Enter the key definition (up to 64 characters) at the cursor position. Correct errors by pressing the CURSOR LEFT key to delete characters, or the HOME key to clear the definition.

DEFINING THE FUNCTION KEY LABELS

You can define labels for the function keys, unshifted and shifted, and display them on the label line at the bottom of the screen (see LABELS parameter).

The labels can contain up to seven characters each. They share approximately 350 bytes of nonvolatile memory space with the key definitions.

3 OPERATING THE TERMINAL

Keyboard Descriptions 3-1
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This chapter describes keyboard operations, communication modes, and some of the terminal's special features.

KEYBOARD DESCRIPTIONS

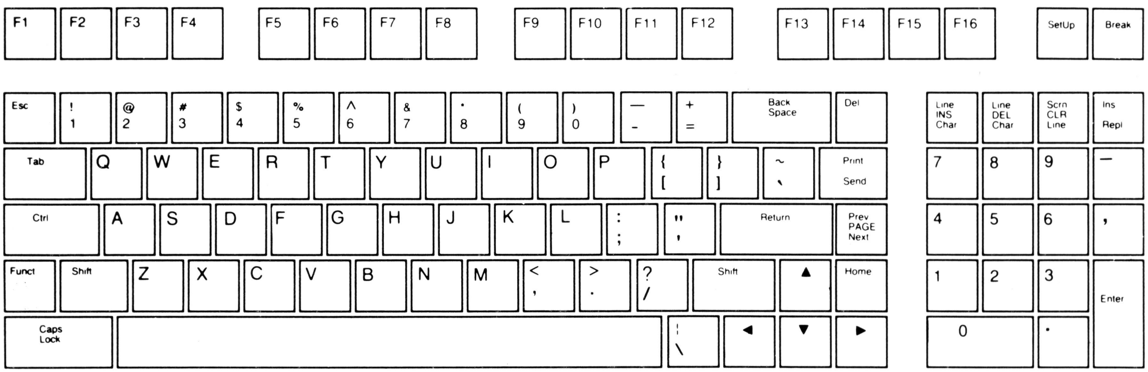
Figures 3-1 through 3-4 illustrate the four U.S. keyboards supported by the terminal in all terminal personalities. Key codes are listed in Appendix C. Optional international keyboards are listed in Appendix A.

The alphanumeric keys generate the ASCII character codes given in Appendix H. The numeric keypad keys (identified in this guide by the subscript "kpd") also perform special terminal functions.

WY-60 ASCII Keyboard

The WY-60 ASCII keyboard is shown in Figure 3-1.

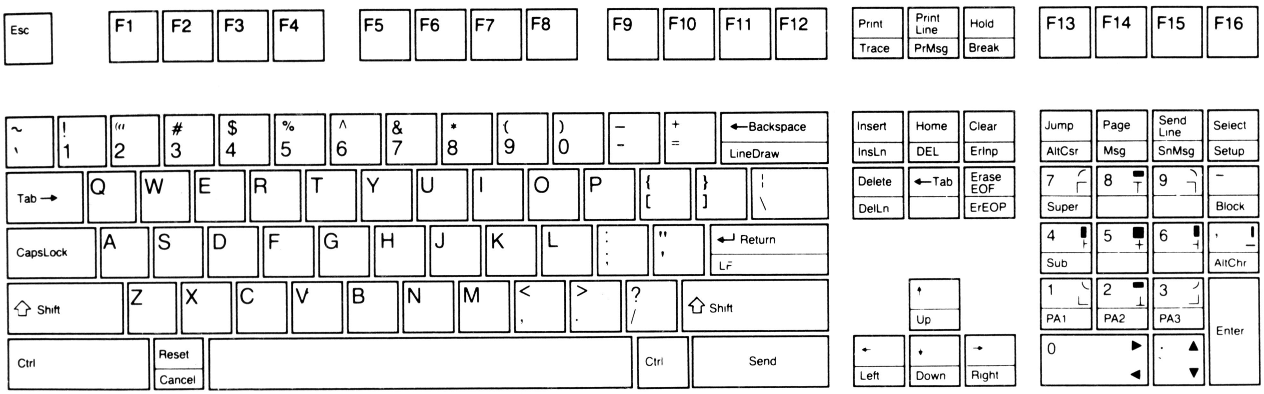
Figure 3-1 WY-60 ASCII Keyboard Layout



IBM RT/316X-Style Keyboard

The IBM RT/316X-Style keyboard (Figure 3-2) is recommended for the IBM 3101-1X and IBM 3101-2X personalities.

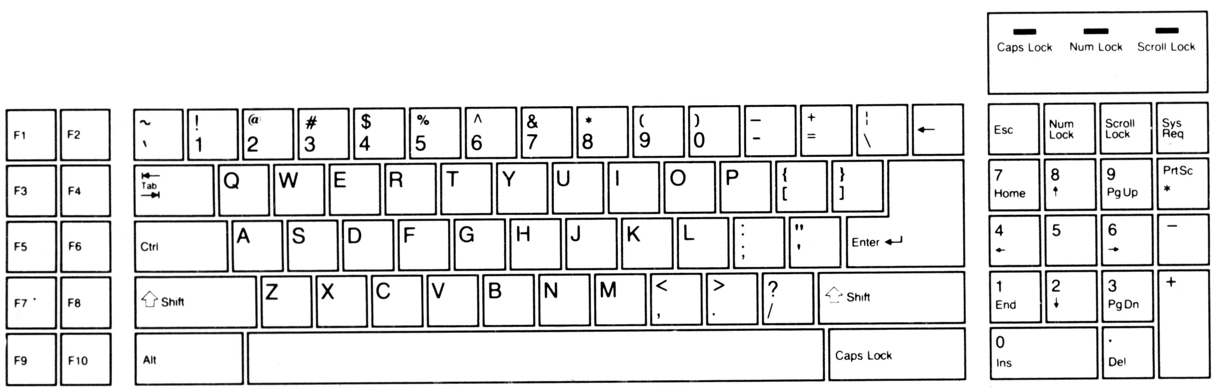
Figure 3-2 IBM RT/316X-Style Keyboard Layout



AT-Style Keyboard

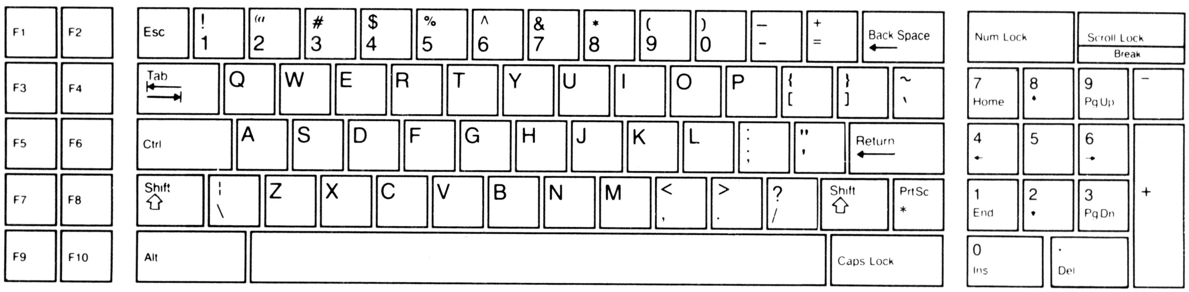
The AT-style keyboard (Figure 3-4) is recommended for the AT or PC personalities.

Figure 3-3 AT-Style Keyboard Layout



PC-Style Keyboard

Figure 3-4 PC-Style Keyboard Layout



Remote Keyboard Functions

Table 3-1 describes the remote functions of the keys in the terminal's native mode. The keys send different codes in other personalities (see Appendix C).

Note--Keep in mind that unless your computer program recognizes the codes sent by these keys, the effects will not be as described.

Table 3-1 Remote Keyboard Functions

WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	PC/AT-Style Keyboards	Description
BACK SPACE	BACK SPACE	BACK SPACE	Moves the cursor left one position.
BREAK	BREAK[1]		Sends a break signal to the computer.
CLR SCRN[2]	ER EOP		Clears the page to space characters, starting at cursor position.
CLR LINE	ERASE		Clears the cursor line to space characters, starting at cursor position.
CTRL	CTRL	CTRL	When pressed with another key, generates a control code.
CURSOR KEYS	CURSOR KEYS	CURSOR KEYS	Move the cursor in the direction of the arrow.
DEL	DEL	DEL	Sends ASCII DEL code.
DEL LINE	DEL LN		Deletes the entire cursor line, moving the lines below it up one line.

1. On this keyboard, the name on the front face of the key indicates the key's function when the key is pressed together with the CTRL key.
2. On this keyboard, the upper name on the key indicates the shifted key.

Table 3-1 Continued

WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	PC/AT-Style Keyboards	Description
DEL CHAR	DELETE		Deletes the cursor character, moving all characters to the right of the cursor left one position.
ENTER	ENTER	ENTER[3]	If the ENTER setup parameter is set to "CR" or "CRLF," moves the cursor to the first position of the current or next line; if set to "TAB," acts like the TAB key.
ESC	ESC	ESC	Sends an ASCII ESC character to the computer.
F1-F16	F1-F16	F1-F10	Shifted and unshifted, these keys send a sequence of codes or characters to the computer.
FUNCT	HOLD	SCROLL LOCK	If CORNER KEY setup parameter is set to "FUNCT," sends an ASCII SOH, another key's code, and an ASCII CR when pressed together with an alphanumeric key. If set to "HOLD," holds the current data on the screen until pressed again.
HOME	HOME	HOME	Moves the cursor to the top left corner of the page.

3. AT-style keyboard only

Table 3-1 Continued

WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	PC/AT-Style Keyboards	Description
INS LINE	INS LN		Inserts a line of space characters below the cursor line, pushing data below the inserted line down a line.
INS CHAR			Inserts a space at the character position, moving all succeeding characters right one position.
INS	INSERT	INS	Turns on insert mode.
	LF		Moves the cursor down to the same position in the next line.
PREV PAGE	SHIFT PAGE	PG UP	Displays the previous page (or upper window if screen has been split).
NEXT PAGE	PAGE	PG DN	Displays the next page (or lower window if screen has been split).
PRINT	PRINT	PRT SC	Sends the formatted page to the printer port.
REPL			Turns on replace mode.

Table 3-1 Continued

WY-60 ASCII Keyboard	**IBM RT/ 316X-Style Keyboard**	**PC/AT-Style Keyboards**	**Description**
RETURN	RETURN	RETURN[4]	If the RETURN setup parameter is set to "CR," moves the cursor to the first position of the current line; if set to "CR,LF," moves the cursor to the first position of the next line. If set to "TAB," functions the same as the TAB key.
SEND	SEND		Sends the data from the top of the page through the cursor position to the data port.
	SEND LINE		Sends the cursor line to the data port, starting at cursor position.
	SN MSG		Sends the unprotected characters in a block to the data port.
SHIFT	SHIFT	SHIFT	Pressed with another key, selects the upper character shown on the key, or capitalizes alphabetic characters. Changes operation of some special keys (e.g., HOME, TAB).
TAB	TAB ⟶	TAB	Moves cursor to next tab stop.
SHIFT TAB	⟵ TAB	SHIFT TAB	Moves cursor to previous tab stop (backtab).

4. PC-style keyboard only

Local Keyboard Commands

Table 3-2 lists local keyboard commands in the terminal's native mode. If no key sequence is listed for a particular keyboard, the command is not available on that keyboard.

Note--On the PC- and AT-style keyboards, the NUM LOCK key toggles between numeric codes (NUM LOCK on) and special functions (NUM LOCK off) for the keys on the numeric keypad. When these keys are listed in Table 3-2, NUM LOCK must be off for the command to be executed.

Table 3-2 Local Keyboard Commands

Command	Key Sequence WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Put terminal in setup mode	SHIFT SETUP	SETUP[1]	SHIFT SYS REQ	SHIFT SCROLL LOCK
Partially reset terminal, including communication; unlock keyboard, turn off all print modes	SETUP	RESET	SYS REQ	ALT
Toggle between block and full-duplex modes	SHIFT BREAK	BLOCK		
Select other port as data port	CTRL SHIFT BREAK	CTRL SHIFT BREAK		

1. On this keyboard, the name on the front face of the key indicates the key's function when pressed together with the CTRL key.

Table 3-2 Continued

Command	Key Sequence WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Turn auxiliary print mode on/off	CTRL PRINT[2]		CTRL SHIFT PRT SC	CTRL SHIFT PRT SC
Turn monitor mode on/off	CTRL SHIFT 1kpd	CTRL SHIFT 1kpd	CTRL SHIFT 1kpd	CTRL SHIFT 1kpd
Turn keyclick on/off	SHIFT ENTER	SHIFT ENTER	SHIFT ENTER	
Turn status line display on/off	CTRL CURSOR RIGHT	CTRL CURSOR RIGHT		
Turn on instant screen saver[3]	CTRL CLR SCRN			
Turn Wyseword mode on/off	CTRL ·kpd		CTRL ·kpd	CTRL ·kpd
Turn on Wyseworks	CTRL CAPS LOCK	CTRL CAPS LOCK	CTRL CAPS LOCK	CTRL CAPS LOCK
Speed scrolling rate	CTRL SHIFT CURSOR UP	CTRL SHIFT CURSOR UP	CTRL SHIFT CURSOR UP	CTRL SHIFT CURSOR UP

2. On this keyboard, the upper name on the key indicates the shifted key.
3. SCRN SAVER parameter must be on.

Table 3-2 Continued

Command	**Key Sequence** WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Slow scrolling rate	CTRL SHIFT CURSOR DOWN	CTRL SHIFT CURSOR DOWN	CTRL SHIFT CURSOR DOWN	CTRL SHIFT CURSOR DOWN
Home cursor and clear page	CTRL SHIFT HOME	CTRL SHIFT HOME	CTRL SHIFT HOME	CTRL SHIFT HOME
Display page 0	CTRL 0_{kpd}		CTRL 0_{kpd}	CTRL 0_{kpd}
Display page 1 (if more than one page is defined)	CTRL 1_{kpd}		CTRL 1_{kpd}	CTRL 1_{kpd}
Display page 2 (if defined)	CTRL 2_{kpd}		CTRL 2_{kpd}	CTRL 2_{kpd}
Display page 3 (if defined)	CTRL 3_{kpd}		CTRL 3_{kpd}	CTRL 3_{kpd}
Display next page (or activate other window if screen is split)	CTRL NEXT PAGE			
Display previous page (or activate other window if screen is split)	CTRL PREV PAGE			
Toggle between splitting screen and restoring full screen format (splits screen at line 12)	CTRL SHIFT $-_{kpd}$			

Table 3-2 Continued

Command	Key Sequence: WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Raise horizontal split and adjust display	CTRL $-_{kpd}$			
Lower horizontal split and adjust display	CTRL $,_{kpd}$			
Roll active window up in page (if screen is split)	CTRL CURSOR UP	CTRL CURSOR UP		
Roll active window down in page (if screen is split)	CTRL CURSOR DOWN	CTRL CURSOR DOWN		
Toggle CAPS LOCK on/off	CAPS LOCK	CAPS LOCK	CAPS LOCK[4]	CAPS LOCK
Toggle NUM LOCK on/off			NUM LOCK[4]	NUM LOCK

4. On when LED light is on.

WYSEWORD MODE

When your computer is loaded with the WordStar word-processing program, specified keys send the WordStar commands described in Appendix D. When Wyseword is on, "w" appears on the status line.

WYSEWORKS

The terminal includes a set of desktop accessories called "Wyseworks," described in a separate Wyseworks reference card.

DATA COMMUNICATIONS

The terminal is set up to communicate with the computer through the MODEM port, with the AUX port serving as an auxiliary (printer) port. You can reverse this by changing the DATA/PNTR parameter in setup mode to "AUX/MODEM." This selects the AUX port as the data port and the MODEM port as the printer port.

Four modes of communication are possible between the terminal and an attached computer: full duplex, half duplex, block, and half-duplex block. Figure 3-5 shows how the terminal handles data in these communication modes.

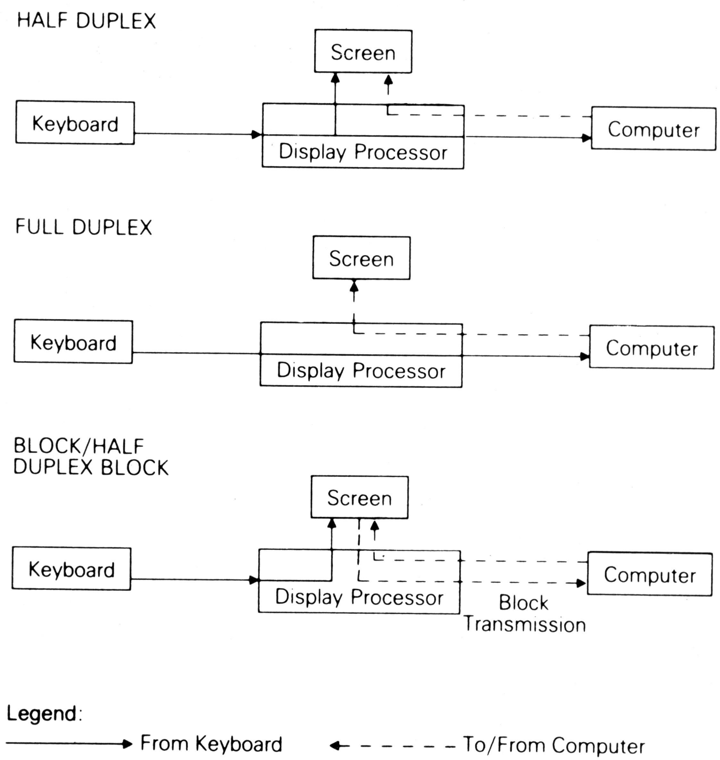
In full duplex mode, data you enter at the keyboard goes only to the computer. The terminal can send and receive data at the same time.

In half-duplex mode, data you enter at the keyboard goes to the computer and to the terminal at the same time.

In block mode, data you enter goes to the terminal only.

Half-duplex block mode, used when a modem is connected to the terminal, is the same as block mode except that the terminal controls the receipt and transmission of data by Request to Send and Clear to Send lines.

Figure 3-5 Data Transmission in the Communication Modes



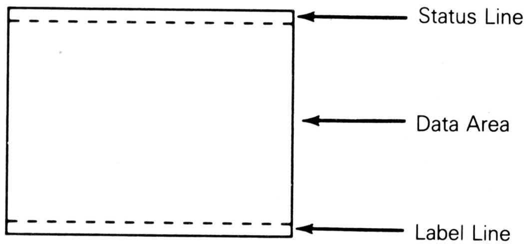
PRINTING

Refer to "Sending Data" in Chapter 5 for information on printing.

SCREEN AREAS

Figure 3-6 shows the three areas of the screen: the status line, the data area, and the label line.

Figure 3-6 Screen Areas



Status Line

Unless you turn off its display in setup mode or with an escape sequence, the top line on the screen displays terminal or computer status messages. Appendix E lists the terminal status messages and their meanings.

Label Line

The bottom line of the screen can be a "label line" for displaying function key labels or a single longer message, or it can be an extra data line.

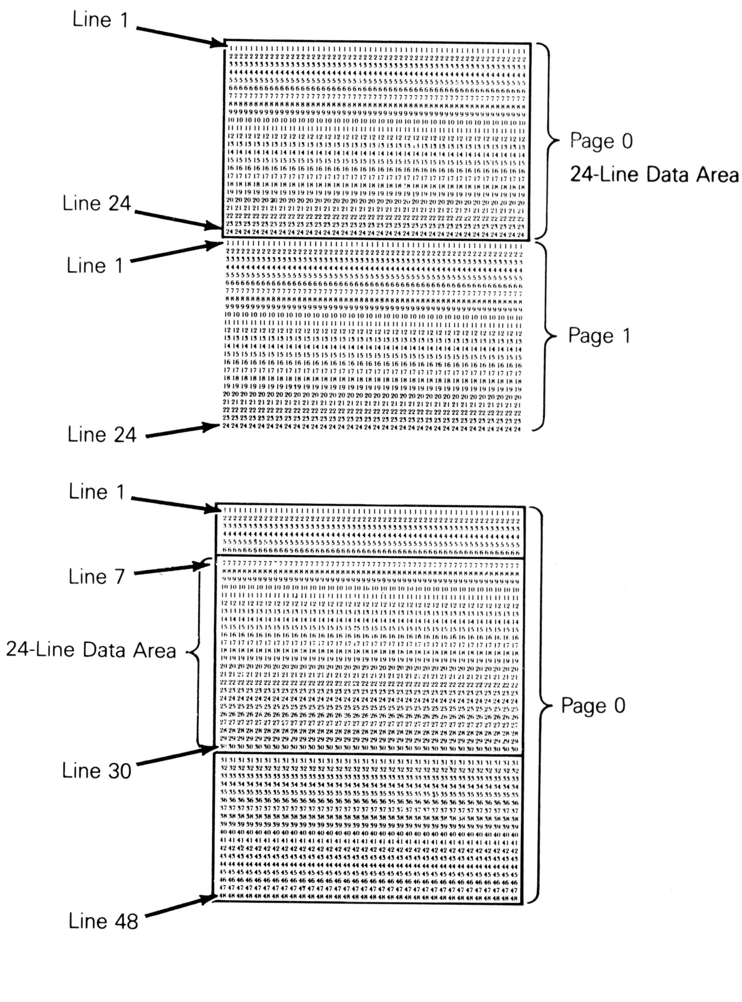
Data Area

The data area of the screen is defined by the number of lines of a page of display memory that can be viewed at any one time.

The default data area is 24 data lines. The default page length is also 24 lines, allowing you to see an entire page at a time on the screen. You can choose other combinations of data lines and page length (see the LINES setup parameter and "Working in Display Memory" in Chapter 5).

Figure 3-7 illustrates a 24-line data area in a 24-line and 48-line page.

Figure 3-7 24-Line Data Area in 24- and 48-Line Page



4 TROUBLESHOOTING

Often a suspected terminal malfunction is actually something you can easily fix yourself. Before you place a service call, refer to the solutions suggested in this chapter.

Warning--We are **not** suggesting that you open the terminal or try to fix internal terminal problems. **DO NOT** open the terminal case unless you are a qualified service technician. While the case is open, dangerous voltages are exposed (even when the power is off).

Symptoms and Solutions

Power switch is on but display is blank.

Turn the power switch off and on. Did the terminal beep? If not, make sure the power cord is connected both at the terminal and at the electrical outlet.

Terminal beeps after you turn it on, but you can't see the cursor.

Adjust the brightness slideswitch, sliding it to the far right.

Screen goes blank while the terminal is on.

This is a normal condition when the SCRN SAVER feature is on and the terminal is inactive for approximately 15 minutes. Press the SHIFT key to bring back the display.

Display doesn't respond when you press a key.

- See if "LOCK" appears in the status line. If it does, your program has inadvertently locked the keyboard. To unlock it, press the SETUP key (RESET key on IBM RT/316X-Style keyboard, SYS REQ key on AT-Style keyboard, ALT key on PC-Style keyboard).

- Check the keyboard cable connection.

- If your computer or applications program recognizes only capital letters, see if "CAPS" appears in the status line. If not, press the CAPS LOCK key.

- Check the computer communications setup (see the next symptom).

The computer doesn't respond when you type on the keyboard.

Check the interface cable connections. Is the computer or modem interface cable connected to the port that's selected as the data port? Does it have the right connector pin assignments? (See Appendix B.)

Check the setup selections for COMM MODE (choose FULL DUPLEX) and DATA/PNTR, and be sure that the setup parameter settings for the port selected as the data port match your computer's requirements. (Check BAUD RATE, HANDSHAKING, DATA BITS, STOP BITS, and PARITY.)

When the terminal is turned on, an A, C, E, K, W, X, Y, or Z displays in the bottom right-hand corner of the screen and the bell sounds continuously.

This can result from the final manufacturing test. Press the SETUP key to exit the self-test (RESET key on IBM RT/316X-Style keyboard, SYS REQ key on AT-Style keyboard, ALT key on PC-Style keyboard).

When the terminal is turned on, a 0, 1, 9, p, or P appears in the bottom right-hand corner of the screen.

These error codes indicate a hard failure on the logic board. The terminal needs to be serviced by a qualified technician.

Nonsense characters (garbage) appear on the screen.

See if the BAUD RATE setting for the port selected as the data port matches your computer's baud rate.

See if the pin connections of the computer or modem interface cable match those of the port that's selected as the data port (see Appendix B).

Characters become garbled as they appear on the screen.

Make sure the STOP BITS and PARITY settings for the port selected as the data port match the requirements of your computer.

All characters appear twice.

Select FULL DUPLEX for the COMM MODE setup parameter.

Your printer doesn't respond when you try to print.

- Check that the printer is set up and functioning according to your printer manual.

- Check the interface cable connections. Is the printer cable connected to the port that's selected as the printer port? Does it have the right connector pin assignments? (See Appendix B.)

- Make sure that the printer port setup selections match your printer's requirements. (Check BAUD RATE, HANDSHAKING, DATA BITS, STOP BITS, and PARITY.)

- Make sure you've activated the printer port by turning on a print mode or sending a page print command (see "Sending Data" in Chapter 5).

5 PROGRAMMING THE TERMINAL

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CONVENTIONS AND SYNTAX NOTATION

This chapter describes the command sequences that you can include in your programs to control how the terminal displays or processes data. The command descriptions assume familiarity with terminal programming concepts.

Native Mode

Commands described in this chapter apply to the terminal's native operating mode. Appendix F contains information on the command sequences recognized in the terminal's other personalities.

Caution--Execute only documented commands. Invalid commands may cause unpredictable results, including loss of data.

Control Codes

Control codes are shown with the notation "CTRL," indicating the CTRL key. Enter a control code by holding down the CTRL key together with another key.

Escape Sequences

To send an escape sequence from the computer, send the ASCII ESC character (27 decimal, 1B hexadecimal) followed by the sequence.

The terminal must be in block mode when you enter escape sequences from the keyboard. Press and release the ESC key before pressing the following key(s) in the sequence.

Escape sequences that change the terminal's operating parameters aren't stored in nonvolatile memory unless you enter setup mode and save the changes according to the exit instructions.

Spacing--Escape sequences are shown with a space between each character to make the command easier to read--don't enter the spaces. When a space character is part of a command sequence, it's explicitly shown as

ESC SPACE

Variables--Variables within an escape sequence are shown in underlined lowercase letters. For example, the format for the ESC G command is

ESC G attr

where attr represents a character display attribute, such as dim or underline. Don't enter the underlined characters. The values for the variables are usually listed immediately after the command.

MONITOR MODE

Turn monitor mode on	**ESC U**
Turn monitor mode off (default)	**ESC u**
	or ESC X

When monitor mode is on, the terminal displays symbolic representations of received codes but does not execute the codes. The symbols displayed depend on the terminal's current operating mode (personality) or on the character set you choose (see Chapter 6). Table G-1 in Appendix G lists the default symbols displayed in the terminal's native mode.

COMMUNICATING WITH THE COMPUTER

The commands in this section control the terminal's operating and communication modes.

Selecting a Personality

Select terminal personality **ESC ~ mode**

mode is the operating mode related to the terminals listed.

mode	Personality	Terminals
"	WY50+	Wyse WY-50, WY-50+, WY-100
#	TVI 910+	TeleVideo 910, 910+
$	TVI 925	TeleVideo 925
%	ADDS VP A2	ADDS Viewpoint A2
&	HZ 1500	Hazeltine 1500
'	TVI 912/920	TeleVideo 912, 920
(	TVI 950	TeleVideo 950
)	DG200	Data General DASHER D100, D200
*	IBM 3101-1X	IBM 3101, Model 1X
+	ADM 31	Lear Siegler ADM 3A, ADM 5, ADM 31
,	TVI 955	TeleVideo 955
4	WY-60	Native mode
5	PC Term	PC-type terminals
6	AT Term	PC/AT type-terminals
7	IBM 3101-2X	IBM 3101, Model 2X
8	ADDS VP-60	ADDS Viewpoint 60

Caution--The terminal may clear the display memory when executing this command.

Enhance Mode

Turn enhance mode off **ESC ~ SPACE**
Turn enhance mode on (default) **ESC ~ !**

In enhance mode, the terminal supports additional features in some of the nonnative personalities.

Communication Modes

Turn full-duplex mode on (default)	**ESC C ESC D F**
Turn half-duplex mode on	**ESC C ESC D H**
Turn block mode on	**ESC B**
Turn half-duplex block mode on	**ESC D H ESC B**

The only key codes automatically transmitted to the computer in block mode are those generated by the BREAK key, FUNCT key sequences, and the function keys when their direction is "remote."

Turn ACK mode off	ESC e 6
Turn ACK mode on (default)	ESC e 7

When ACK mode is on, the terminal sends the ASCII ACK character to the computer when it receives an CTRL E, or after executing

- Commands that change a port's operating parameters
- Page print commands
- Font load or clear commands

Configuring the Ports

Select MODEM port for data communications, AUX port as printer port	ESC e 8
Select AUX port for data communications, MODEM port as printer port	ESC e 9

The different baud rates available for each port still apply after the port's function is changed.

Set MODEM port operating parameters — **ESC c 0 baud stop parity word**

Set AUX port operating parameters — **ESC c 1 baud stop parity word**

baud is the baud rate.

MODEM Port

baud	**Baud Rate**
0	38400
1	19200
2	9600 (default)
3	4800
4	2400
5	2000
6	1800
7	1200
8	600
9	300
:	150
;	134.5
<	110
=	75
>	50

AUX Port

baud	**Baud Rate**
0	19200
1	9600 (default)
2	7200
3	4800
4	3600
5	2400
6	2000
7	1800
8	1200
9	600
:	300
;	150
<	134.5
=	110

stop is the number of stop bits.
parity is the parity bit.
word is the number of bits in a data word.

stop	**Stop Bits**
0	1 (default)
1	2

parity	Parity Bit
0	None (default)
1	Odd
2	Mark
3	Even

word	Data Word
0	7 bits
1	8 bits (default)

Note--Unless ACK mode is off, the terminal sends an ACK character to the computer after executing a change in operating parameters. No data should be sent to the terminal until the ACK is received. The ACK and all subsequent data are sent in the new data format.

Set MODEM port receive handshaking protocol	**ESC** c **2** **hndshk**
Set AUX port receive handshaking protocol	**ESC** c **3** **hndshk**
Set MODEM port transmit handshaking protocol	**ESC** c **4** **hndshk**
Set AUX port transmit handshaking protocol	**ESC** c **5** **hndshk**

Handshaking Protocol

hndshk	Receive	Transmit
0	None (default)	None (default)
1	X-on/X-off	X-on/X-off
2	DTR (MODEM port) DSR (AUX port)	
3	Both	

Set maximum data transmission speed ESC c 6 **max**

max	Maximum Speed
1	60 characters per second
2	None (default)
3	150 characters per second

Note--A separate command sets the transmission speed of the key definitions (see "Redefining the Keys" in this chapter).

Identifying the Terminal

Send terminal ID **ESC SPACE**

The terminal returns the following three-byte sequence to the computer:

6 0 CR

Loading the Time

Load time of day **ESC c 8 hh mm**

hh is a two-digit decimal number between 00 and 23 identifying the hour.
mm is a two-digit decimal number between 00 and 59 identifying the minutes.

This sequence loads the time of day into the terminal's memory. The format requires a 24-hour (military) clock, beginning with midnight (hh = 00). However, the terminal displays the time in a 12-hour format with a.m. and p.m. indicators. When the terminal is turned on, the time defaults to 08:00, or 8:00 a.m.

Note--The time is accurate within about five seconds per day. If the terminal is left on continuously, the clock may gain or lose up to a minute every two weeks.

CONTROLLING KEYBOARD FUNCTIONS

Editing Modes

Turn local edit mode on, duplex edit mode off	**ESC k**
Turn duplex edit mode on, local edit mode off (default)	**ESC l**

When the terminal is in local edit mode, editing key codes are sent to the terminal only, regardless of the terminal's communication mode. (See "Redefining the Keys" in this chapter for a list of the editing keys.)

Wyseword Mode

Turn Wyseword mode off (default)	**ESC ~ .**
Turn Wyseword mode on	**ESC ~ /**

When Wyseword mode is on, designated keys send the WordStar codes listed in Table D-1 in Appendix D. These codes take precedence over any other key codes except application key codes.

Application Key Mode

Turn application key mode off (default)	**ESC ~ 2**
Turn application key mode on	**ESC ~ 3**

When application key mode is on, the function keys, numeric keypad keys, and certain editing keys send the 8-bit codes listed in Table C-5 in Appendix C. The codes are unique to each key and override all other codes, including key redefinitions and Wyseword codes.

Sounding the Bell

Sound bell	**CTRL G**

Locking the Keyboard

Lock keyboard	**CTRL O or ESC #**
Unlock keyboard	**CTRL N or ESC "**

When the keyboard is locked, all keys are ignored except the BREAK, SETUP, FUNCT, and function keys.

Miscellaneous Setup-Related Keyboard Commands

Turn keyclick off	**ESC e $**
Turn keyclick on (default)	**ESC e %**
Turn CAPS LOCK on	**ESC e &**
Turn CAPS LOCK off (default)	**ESC e '**
Turn key repeat off	**ESC e ,**
Turn key repeat on (default)	**ESC e -**
Define CAPS LOCK key as CAPS LOCK (default)	**ESC e U**
Define CAPS LOCK key as REV	**ESC e V**

Redefining the Keys

You can redefine the keys listed in Tables 5-1 and 5-2 from the computer with two different escape sequences:

- o ESC z redefines the function keys (shifted and unshifted); their direction remains "normal."
- o ESC Z redefines any of the programmable keys and redefines the key's direction.

The key definitions share a total of approximately 350 bytes of nonvolatile memory with the function key labels. The definitions can be saved in nonvolatile memory by putting the terminal in setup mode and exiting with the SAVE ALL option.

Note--If you connect another keyboard to the terminal after you've saved key redefinitions in nonvolatile memory, clear the definitions to their default values.

Program function key definition **ESC z fkey sequence DEL**

fkey is a value from Table 5-1.
sequence is up to 255 bytes to be loaded in that key.

Table 5-1 Function Key Values

Function Key	fkey Unshifted	fkey Shifted	Function Key	fkey Unshifted	fkey Shifted
F1	@	`	F9	H	h
F2	A	a	F10	I	i
F3	B	b	F11	J	j
F4	C	c	F12	K	k
F5	D	d	F13	L	l
F6	E	e	F14	M	m
F7	F	f	F15	N	n
F8	G	g	F16	O	o

Program key direction and definition **ESC Z dir fkey sequence DEL or ESC Z dir key sequence DEL**

dir is the key's direction.

dir	Direction
0	Normal (default)
1	Remote
2	Local

fkey is a value from Table 5-1.
key is a value from Table 5-2.

Table 5-2 Editing Key Values*

WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard	key Value
ESC	ESC	ESC	ESC	SPACE
SHIFT ESC	SHIFT ESC	SHIFT ESC	SHIFT ESC	%
TAB	TAB ⟶	TAB	TAB	!
SHIFT TAB	SHIFT TAB ⟶	SHIFT TAB	SHIFT TAB	&
BACK SPACE	BACKSPACE		BACK SPACE	"
SHIFT BACKSPACE	SHIFT BACKSPACE	SHIFT	SHIFT BACK SPACE	'
DEL	DELETE	DEL	DEL	#
SHIFT DEL	SHIFT DELETE	SHIFT DEL	SHIFT DEL	(
RETURN	RETURN		RETURN	$
SHIFT RETURN	SHIFT RETURN		SHIFT RETURN	)
HOME	HOME	HOME	HOME	*
SHIFT HOME	SHIFT HOME	SHIFT HOME	SHIFT HOME	/
CURSOR UP	CURSOR UP	CURSOR UP	CURSOR UP	+
SHIFT CURSOR UP	SHIFT CURSOR UP	SHIFT CURSOR UP	SHIFT CURSOR UP	0

* A blank in any column indicates that the value is unrecognized on that keyboard and the command is ignored.

Table 5-2 Continued

WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard	key Value
CURSOR DOWN	CURSOR DOWN	CURSOR DOWN	CURSOR DOWN	,
SHIFT CURSOR DOWN	SHIFT CURSOR DOWN	SHIFT CURSOR DOWN	SHIFT CURSOR DOWN	1
CURSOR LEFT	CURSOR LEFT	CURSOR LEFT	CURSOR LEFT	-
SHIFT CURSOR LEFT	SHIFT CURSOR LEFT	SHIFT CURSOR LEFT	SHIFT CURSOR LEFT	2
CURSOR RIGHT	CURSOR RIGHT	CURSOR RIGHT	CURSOR RIGHT	.
SHIFT CURSOR RIGHT	SHIFT CURSOR RIGHT	SHIFT CURSOR RIGHT	SHIFT CURSOR RIGHT	3
ENTER	ENTER	ENTER		s
SHIFT ENTER	SHIFT ENTER	SHIFT ENTER		4
REPL	INSERT	INS	INS	q
INS	SHIFT INSERT	SHIFT INS	SHIFT INS	p
NEXT PAGE	PAGE	PG DN	PG DN	r
PREV PAGE	SHIFT PAGE	SHIFT PG DN	SHIFT PG DN	w
SEND	SEND			u
PRINT	SHIFT SEND			t

Table 5-2 Continued

WY-60 ASCII Keyboard	**IBM RT/ 316X-Style Keyboard**	**AT-Style Keyboard**	**PC-Style Keyboard**	**key Value**
CLR LINE	CLEAR			}
CLR SCRN	SHIFT CLEAR			z
	←TAB			P
	SHIFT ←TAB			V
	ERASE EOF			Q
	SHIFT ERASE EOF			W
	PRINT			R
	SHIFT PRINT			X
	SEND LINE			S
	SHIFT SEND LINE			Y
	PRINT LINE			T
	SHIFT PRINT LINE			Z
		END	END	\
		SHIFT END	SHIFT END	]
+kpd	+kpd	+kpd	+kpd	^
SHIFT +kpd	SHIFT +kpd	SHIFT +kpd	SHIFT +kpd	_

Table 5-2 Continued

WY-60 ASCII Keyboard	**IBM RT/ 316X-Style Keyboard**	**AT-Style Keyboard**	**PC-Style Keyboard**	**key Value**
-kpd	-kpd	-kpd	-kpd	¦
SHIFT -kpd	SHIFT -kpd	SHIFT -kpd	SHIFT -kpd	y
		PG UP		:
		SHIFT PG UP		;
5kpd	5kpd	5kpd	5kpd	<
SHIFT 5kpd	SHIFT 5kpd	SHIFT 5kpd	SHIFT 5kpd	=

Reading Key Direction and Definition

Read key direction and definition **ESC Z ~ key**

The terminal returns the key's definition and direction in the format

dir key sequence DEL

If the key has not been redefined, the terminal sends

dir key DEL

Setting Function Key Transmission Speed

Set maximum function key transmission speed — **ESC c 7 max**

max	Maximum Speed
1	60 characters per second
2	None (default)
3	150 characters per second

This sequence applies to any key that has been redefined. If the key hasn't been redefined, the rate of transmission is determined by the speed of transmission for the the data port.

Clearing Key Definitions

Clear key definition — **ESC z fkey DEL or ESC z key DEL**

fkey is a value from Table 5-1.
key is a value from Table 5-2.

CONTROLLING THE SCREEN DISPLAY

Controlling Display Visibility

Turn screen display off	**ESC ` 8**
Turn screen display on (default)	**ESC ` 9**
Turn screen saver off	**ESC e P**
Turn screen saver on (default)	**ESC e Q**

Controlling Scrolling Speed and Type

Set scrolling speed and type — ESC ` scroll

scroll	Scrolling Type	Speed (lines per second)
@	Jump scroll (default)	
<	Smooth scroll	1
=	Smooth scroll	2
>	Smooth scroll	4
?	Smooth scroll	8

If you choose smooth scrolling, you need to select some type of receive handshaking for the data port. Smooth scrolling is not available when 25 or 43 data lines are displayed.

Displaying the Cursor

Set cursor display features — ESC ` cursor

cursor	Cursor Display
0	Off
1	On (default)
2	Steady block (default)
5	Blinking block
4	Steady line
3	Blinking line

Displaying the Status Line

Turn on extended status line	ESC ` a
Turn on standard status line (default)	ESC ` b
Turn off status line display	ESC ` c

Programming a Status Line Message

Program and display computer message on status line	**ESC F message CR**

message is a character string of up to 46 characters for an 80-column screen or 98 characters for a 132-column screen.

Programming a Label Line Message

Program and display computer message on unshifted label line	**ESC z (text CR**
Program computer message on shifted label line	**ESC z) text CR**
Display shifted label line	**ESC z P CR**
Turn off shifted label line display	**ESC z DEL**
Clear unshifted label line message	**ESC z (CR**
Clear shifted label line message	**ESC z) CR**

text is a character string of up to 78 characters for an 80-column screen or 130 characters for a 132-column screen.

The unshifted label line message is displayed automatically. Unless you turn off the display of the shifted label line, it's displayed when the SHIFT key is pressed.

Note--You can prevent the display of the unshifted label line by assigning the invisible display attribute (ESC A 1 1). The assigned attribute will apply to both the unshifted and shifted label lines.

Programming a Function Key Label

Program and display a function key label	**ESC z field label CR**
Clear a function key label	**ESC z field CR**

field is the field code given in Table 5-3. You can label up to

- 8 fields (shiftable to 16) on an 80-column screen
- 16 fields (shiftable to 32) on a 132-column screen

label is a character string of up to

- 9 characters for an 80-column screen
- 7 characters for a 132-column screen

Note--Function key labels can be saved in nonvolatile memory only if defined in setup mode.

Table 5-3 Function Key Field Codes

	Field Code			Field Code	
Key	**Unshifted**	**Shifted**	**Key**	**Unshifted**	**Shifted**
F1	0	P	F9	8	X
F2	1	Q	F10	9	Y
F3	2	R	F11	:	Z
F4	3	S	F12	;	[
F5	4	T	F13	<	\
F6	5	U	F14	=	]
F7	6	V	F15	>	^
F8	7	W	F16	?	_

Defining the Data Area

You can change the line and column display either in setup mode or from the computer.

Changing the Number of Displayed Columns--Before you change the number of displayed columns, clear the function key labels. You can program them again for the new display width.

Select 80-column display (default)	**ESC ` :**
Select 132-column display	**ESC ` ;**

The screen isn't cleared when the terminal executes these commands. Allow for a delay of 150 ms before sending data to the terminal. These commands are ignored when economy 80-column mode is on.

Economy 80-Column Mode

Turn off economy 80-column mode (default)	**ESC e F**
Turn on economy 80-column mode	**ESC e G**

Caution--When executing these commands, the terminal clears the entire display memory, including the status line.

Economy 80-column mode makes additional pages of display memory available. This mode must be off if you want to select the standard 80-column or the 132-column display.

Changing the Number of Data Lines

Display 24 data lines (default)	**ESC e (**
Display 25 data lines	**ESC e)**
Display 42 data lines	**ESC e ***
Display 43 data lines	**ESC e +**

Caution--The terminal clears the display memory when executing any of these commands.

When you display 25 or 43 data lines, commands to display function key labels or a label line message are ignored, and smooth scrolling is not available.

Note--The terminal supports only 24 lines to a page in all nonnative terminal personalities except WY-50+, PC, and AT modes (see Appendix F).

WORKING IN DISPLAY MEMORY

Defining a Page

Divide memory into pages **ESC w length**

length is a value that defines the length of the page by a multiple of the number of data lines displayed.

length	Multiple	Length of Page
G	1 x lines	Equal to the number of data lines (default)
H	2 x lines	Double the number of data lines
I	4 x lines	Four times the number of data lines
J	*	One page contains the number of data lines; a second page contains the rest of the lines remaining in memory

Note--ESC w I is available only in the 50+ personality.

Caution--Executing these page definition commands clears the display memory.

Not all length values are valid for the data lines in effect. Table 5-4 summarizes the number of pages of each page length available for 24, 25, 42, or 43 lines in the terminal's native mode. (See Appendix F for additional page configurations available in some of the nonnative personalities.) If you select an invalid value for length, the terminal defaults to 1 x lines.

Table 5-4 Valid Page Configurations

Lines	Multiplier	80/132 Columns Lines/Page	80/132 Columns Pages	Economy 80 Columns Lines/Page	Economy 80 Columns Pages
24	1 x lines	24	2	24	3
	2 x lines	48	1	48	1
	*	24 and 24	2	24 and 56	2
25	1 x lines	25	1	25	3
	2 x lines	NA		50	1
	*	NA		25 and 55	2
42	1 x lines	42	1	42	1
43	1 x lines	43	1	43	1

When executing any of the page definition commands, the terminal

- o Clears all pages to null characters
- o Displays page 0 with the cursor at the home position
- o Restores a previously split screen to a full screen format (clearing the pages)

Moving from Page to Page

Display previous page	ESC **w** B
Display next page	ESC **w** C
Display specific page	ESC **w** page

page is the number of the page to be displayed.

page	Page
0	0
1	1
2	2 (when economy 80-column mode is on)

Note--page values 3, 4, 5, and 6 are available in nonhidden attribute modes (see Appendix F).

As you display the pages,

- The cursor maintains its previous position on each page
- The status of protect mode on each page is preserved
- Assigned display attributes on each page are preserved
- Commands for clearing or sending data apply only to the current page

Workspaces--Although all pages share display characteristics (for example, the same number of columns and cursor display), their relative independence results in separate "workspaces," allowing data entered on one page to be treated independently from data on the other pages.

You can also create workspace areas in a single long page.

1. Send a command to display a specific page (ESC w page) before entering data in an area of the page
2. Send the command again when you want to return to that area of the page

These areas of the same page aren't really independent, but they'll act as if they were separate pages: each area will move instantly onto the screen, with the cursor in its previous position.

Splitting the Screen

By dividing the screen's data area into two horizontal segments (windows), you can view selected areas of two pages at the same time--or two areas of the same page if only one page is defined. You can work in the "active" window while the data in the other window remains fixed.

From the page in the active window you can move the cursor through all other pages (including the page that's also fixed in the inactive window). When you display another page in the active window, the cursor maintains its previous position on that page.

You can split the screen with separate commands according to the workspaces you want to create. Table 5-5 summarizes these commands, as well as the commands that restore a full screen format.

Table 5-5 Split Screen Commands

	Split Screen		**Restore Full Screen**	
Workspaces	**Save Data**	**Clear Pages**	**Save Data**	**Clear Pages**
Two pages only	ESC x A <u>line</u>	ESC x 1 <u>line</u>	ESC x @	ESC x 0
Single page longer than 24 lines or multiple pages	ESC x C <u>line</u>	ESC x 3 <u>line</u>	ESC x @	ESC x 0

Split Screen Workspaces in Two Pages Only

Split screen horizontally	**ESC x A line**
Split screen horizontally and clear pages	**ESC x 1 line**

line is a line code corresponding to the line number on the screen that you want to become the top line in the lower (inactive) window. Table I-1 in Appendix I gives the line codes.

For example, if you want the first line of the lower window to be line 16 of the screen's data area, send

ESC x A /

where / is the code for line 16 from Table I-1.

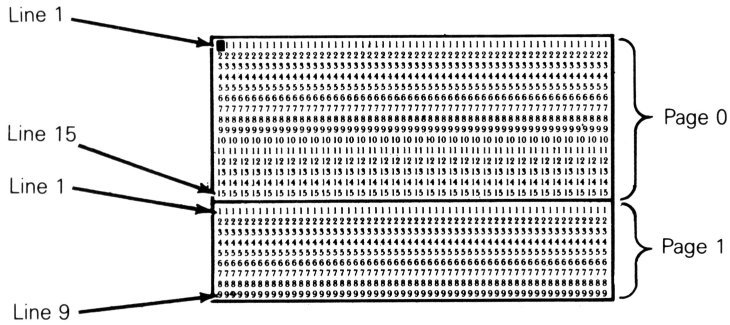
Executing these commands

- o Homes the cursor on all pages
- o Displays the top of the current page in the upper window and makes this the active window
- o Displays the top of the following page in the lower window
- o Either saves the data (ESC x A) or clears all pages to space characters and turns off protect mode (ESC x 1)

When you split the screen with these commands, you are confined to whatever area of each page is displayed--you can't move to other areas of the page in either window, display another page, or adjust the windows.

Figure 5-1 illustrates the workspaces created when you split the screen on line 16 with the ESC x A command, and you are on page 0 when you send the command.

Figure 5-1 Workspaces Created with ESC x A Command



Split Screen Workspaces in Multiple Pages

Split screen horizontally — **ESC x C <u>line</u>**
Split screen horizontally and clear pages — **ESC x 3 <u>line</u>**

<u>line</u> is the line code (from Table I-1) corresponding to the line number of the line you want to become the top line in the lower (inactive) window.

Note--The line you choose for the split is a reference point on the data area of the screen--it has no relation to the length of the page.

Executing these commands

- Either saves the data on all pages (ESC x C), retaining the cursor's previous position on each page, or clears all pages to space characters and homes the cursor (ESC x 3)
- Displays a portion of the current page in the upper window
- Displays a portion of the following page in the lower window if more than one page is defined, or a portion of the same page if only one page is defined

Figure 5-2 illustrates the workspaces created on each page when you split the screen at line 16 with the ESC x C command, and

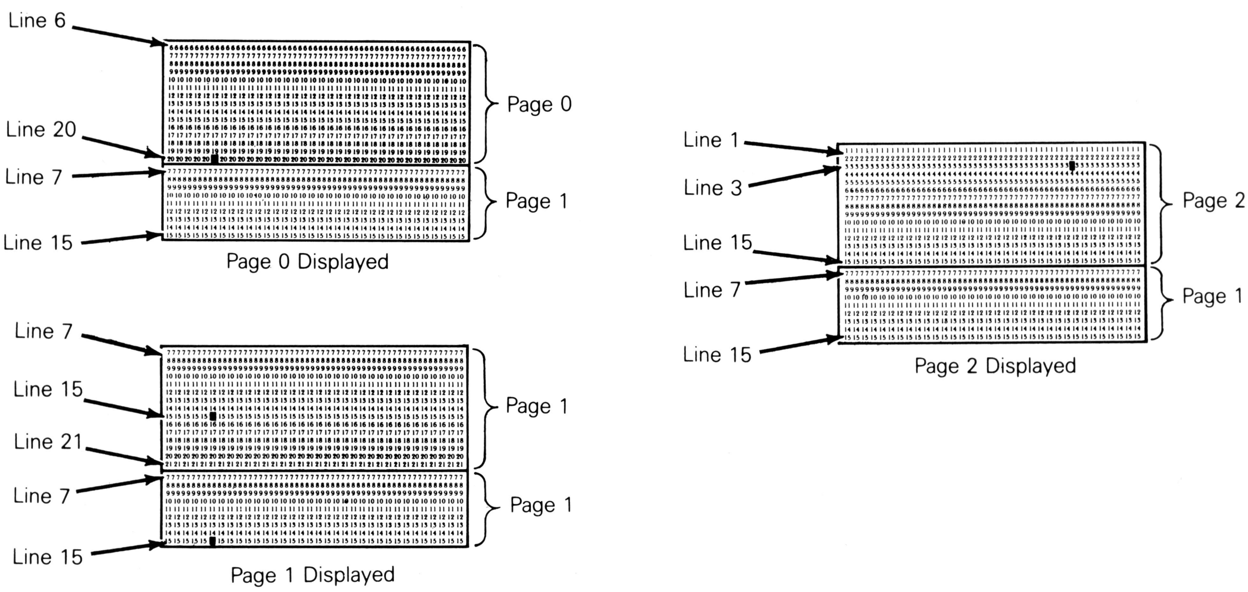
- o You are on page 0 when you send the command
- o The terminal is in economy 80-column mode with memory divided into three 24-line pages
- o The cursor is on

    line 20 of page 0

    line 15 of page 1

    line 3 of page 2

Figure 5-2 Workspaces Created with ESC x C Command



Notice that the position of the cursor on each page determines what lines are displayed.

- The display adjusts to show the cursor line in both windows.
- As many more lines as will fit into each window are also displayed. (As many lines of data as necessary disappear from view, but no data is lost.)
- The page fixed in the inactive window is always the page following the page where the split was made, regardless of which page is being displayed in the active window.
- Because the data in the inactive window is fixed, you see two cursors when page 1 is displayed in the active window.

Activating a Window

Activate upper window	**ESC]**
Activate lower window	**ESC }**
Activate the other window	**ESC J**
	or ESC K

When you activate the other window, the cursor appears in the position it last occupied on the page in that window. The data in the original window becomes fixed.

Note--When the screen has not been split, the ESC J or ESC K commands display the other page when two pages are defined.

Adjusting the Windows--You can adjust the windows of a split screen by one line at a time in two ways:

- By raising or lowering the split in the screen, you can enlarge either the active or inactive window at the expense of the other. The display of the page in each window adjusts accordingly.

- By rolling the active window up or down, you can see a new line of the page in that window. As a new line appears at the bottom of the window, a line disappears from the top of the window, and vice-versa.

Both these adjustments are nondestructive.

Lower horizontal split — **ESC x P**
Raise horizontal split — **ESC x R**

Lowering the split displays one more line of the page in the upper window and one less line of the page in the lower window.

Raising the split displays one more line of the page in the lower window and one less line of the page in the upper window.

The cursor doesn't move when these commands are executed. If the split is raised or lowered to the last line remaining in the window, the commands have no further effect.

Roll window up in page — **ESC w E**
Roll window down in page — **ESC w F**

These commands move the active window up or down in the current page. The data in the inactive window isn't affected.

The cursor doesn't move when these commands are executed unless it's at the bottom of the window when the window is rolled up, or at the top of the window when the window is rolled down. In either case, the cursor is "dragged" back onto the new top or bottom line in order to stay in the window.

Restoring a Full Screen Format

Redefine screen as one window	**ESC x @**
Redefine screen as one window and clear pages	**ESC x 0**

The ESC x @ command

- Homes the cursor if you have split the screen with the ESC x A command
- Preserves the cursor's position on all pages if you have split the screen with the ESC x C command

The ESC x 0 command clears the data from all pages, homes the cursor, and turns off protect mode.

ASSIGNING DISPLAY ATTRIBUTES

The terminal has five character display attributes that you can assign individually or in combination: dim, reverse, underline, blink, and invisible. See Appendix J for the available combinations of these attributes.

The display attributes are hidden, i.e., they don't occupy a character space on the screen. See Appendix F for information on display attributes in the terminal personalities that have nonhidden attributes.

You can assign character display attributes to areas of the screen, to a page, a line, or a character position. You can also assign them specifically to protected characters.

Assigning a Display Attribute to a Message Field

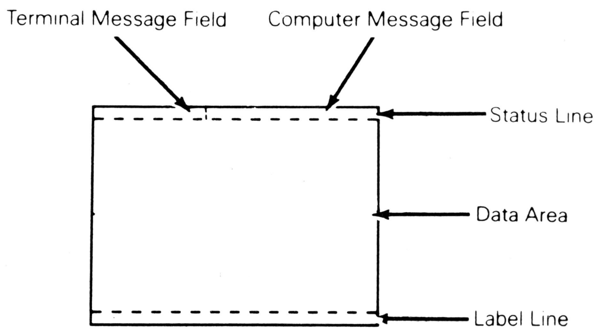
Assign display attribute to a message field — **ESC A <u>field</u> <u>attr</u>**

<u>field</u> is one of the message fields shown in Figure 5-3.

field	**Message Field**
0	Data area
1	Label line
2	Terminal message field on status line
3	Computer message field on status line

<u>attr</u> is a character display attribute value from Table J-1 in Appendix J.

Figure 5-3 Message Fields



Note--In the terminal's native mode, only the reverse attribute can be assigned to the data area.

Assigning Character Display Attributes

Assign character display attribute ESC G attr

attr is a character display attribute value from Table J-1.

Defining Extent of Character Display Attribute

Turn character attribute mode off	ESC e 0
Turn character attribute mode on (default)	ESC e 1
Turn page attribute mode on	ESC e 2
Turn line attribute mode on	ESC e 3

When the terminal is in character attribute mode, sending ESC G assigns the attribute to the next character entered and each succeeding character on the page.

In page or line attribute mode, the assigned attribute extends to all character positions from the cursor to the end of the page or line, or until another attribute is encountered.

Turning off character attribute mode turns on either page or line attribute mode, whichever was last active. If neither was previously selected, the terminal defaults to page attribute mode.

Assign display attribute to write-protected characters ESC ` wpca

wpca is the attribute value for write-protected characters.

wpca	Display Attribute
6	Reverse
7	Dim (default)
A	Normal
B	Blink on
C	Invisible on
E	Underline on
F	Reverse on
G	Dim on

This command assigns a display attribute to subsequently received characters when write-protect mode is on.

The last five values (B through G) enable you to combine attributes. Assigning any of the first three values (6, 7, A) clears all other write-protected character attributes.

Assigning Line Attributes

Assign line attribute — ESC G lattr

lattr	Line Attribute
@	Single-high, single-wide characters (default)
A	Single-high, double-wide characters
B	Top half of double-high, single-wide characters
C	Bottom half of double-high, single-wide characters
D	Top half of double-high, double-wide characters
E	Bottom half of double-high, double-wide characters
G	Normal background
H	Bold background
I	Invisible background (default)
J	Dim background

This command lets you change the height and width of the characters, and the background intensity of the line, on a line by line basis. The line attributes can be combined with the character display attributes.

PROTECTING DATA

To protect data,

1. Turn on write-protect mode, then enter the data to be protected.

2. Turn on protect mode to protect the write-protected data.

Writing Data to be Protected

Turn write-protect mode off (default)	**ESC (**
Turn write-protect mode on	**ESC)**

When write-protect mode is on, all subsequently received characters are displayed and stored with the display attribute selected for write-protected characters.

Write-Protecting a Column

Clear cursor column to write-protected spaces	**ESC V**

Note--The terminal doesn't have to be in write-protect mode to execute this command.

Turning on Protect Mode

Turn protect mode off (default)	**ESC '**
Turn protect mode on	**ESC &**

When protect mode is on,

- o The cursor can't be moved into a protected area. If addressed there, it will jump to the first unprotected position when data is entered.
- o Tabulating commands move the cursor to the first unprotected character position beyond a protected tab stop.
- o No data can scroll off the screen.
- o A protected line cannot be deleted, nor can a line be inserted at a protected line.

DISPLAYING GRAPHICS CHARACTERS

The terminal's default character set contains 16 line-drawing graphics characters. You can control these as a group in graphics mode, or individually with an escape sequence that allows the characters to be entered one at a time in the normal operating mode.

Turn graphics mode on	**ESC H CTRL B**
Turn graphics mode off	**ESC H CTRL C**
Display one graphics character	**ESC H <u>key</u>**

<u>key</u> is the key shown in Table 5-6.

When graphics mode is on, the keys indicated in Table 5-6 display the corresponding graphics character. You can't enter normal alphanumeric text, but you can enter commands. When protect mode is on, graphics characters are automatically protected.

Table 5-6 Graphics Character Codes

Graphics Character	key	Graphics Character	key	Graphics Character	key
┬	0	│	6	═	<
└	1	█	7	┴	=
┌	2	┼	8	║	>
┐	3	┤	9	▒	?
├	4	─	:		
┘	5	░	;		

CONTROLLING THE CURSOR

Cursor Movement

Move cursor left	CTRL H
Move cursor right	CTRL L
Move cursor up; no scroll	CTRL K
Move cursor up; scroll (reverse linefeed)	ESC j
Move cursor down; scroll (linefeed)	CTRL J
Move cursor to start of line	CTRL M
Move cursor to start of next line	CTRL _
Move cursor to home position in current page	ESC { or CTRL ^

Cursor Modes

Turn end-of-line wrap mode off	**ESC d .**
Turn end-of-line wrap mode on (default)	**ESC d /**
Turn received CR mode off (default)	**ESC e 4**
Turn received CR mode on	**ESC e 5**
Turn autopage mode off (default)	**ESC d ***
Turn autopage mode on	**ESC d +**
Turn autoscrolling mode off	**ESC N**
Turn autoscrolling mode on (default)	**ESC O**

Locking the Cursor Line

Turn line lock mode on	**ESC ` H**
Turn line lock mode off (default)	**ESC ` I**

This command locks the cursor line so it remains fixed when the display scrolls; the cursor moves down to the next unlocked line. If there is no unlocked line below, the cursor moves up to the nearest unlocked line. The cursor cannot move into a locked line. Turning off line lock mode unlocks all the lines on the page.

Note--When line lock mode is on, smooth scrolling is inhibited.

Addressing/Reading the Cursor

In all the commands in this section,

- lll is a one- to three-digit decimal value of the line, relative to home, that corresponds to the line where you want to position the cursor

- ccc is a one- to three-digit decimal value of the column, relative to home, that corresponds to the column where you want to position the cursor

- line is the line code from Table I-1 (Appendix I) that corresponds to the line on the page where you want to position the cursor.

- col is the column code from Table I-2 that corresponds to the column where you want to position the cursor

- page or wnd is the number of the page or the window of a split screen where the cursor will be moved

wnd/page	**Window or Page**
0	Page 0 or upper window
1	Page 1 or lower window
2	Page 2 (when economy 80-column mode is on)

Note--wnd/page values 3, 4, 5, and 6 are available in nonhidden attribute modes (see Appendix F).

- The cursor can be addressed to a protected position but it can't write anything there.

Addressing the Cursor

Address cursor in 80-column current page	**ESC = line col**
Address cursor in 80-column specific page	**ESC w @ page line col**
Address cursor in specific 80-column window/page	**ESC - wnd line col** **ESC - page line col**
Address cursor in 80/132-column current page	**ESC a lll R ccc C**

R is the ASCII character "R." C is the ASCII character "C."

Reading the Cursor's Address

Read cursor address in 80-column current page	**ESC ?**
Read 80-column page number and cursor address	**ESC w `**
Read 80-column window (or page) number and cursor address	**ESC /**

In 80-column mode, the terminal returns the cursor's address in the following formats:

> line col CR
>
> page line col CR
>
> wnd line col CR (if screen is split)
>
> page line col CR (if screen is not split)

CR is the carriage return that terminates the sequence.

Read cursor address in 80/132-column page	**ESC b**

The terminal returns an eight-byte address in the format

> **lll R ccc C**

No CR character is sent after the coordinates.

EDITING DATA

Tab Stops

Clear all tab stops	**ESC 0**
Set tab stop at cursor position	**ESC 1**
Clear tab stop at cursor position	**ESC 2**
Tabulate cursor	**ESC i** or **CTRL I**
Backtab	**ESC I**

If the tab stop is at a protected position, the cursor moves to the next or previous unprotected position.

Inserting Data

Turn insert mode on, replace mode off	**ESC q**
Turn insert mode off, replace mode on (default)	**ESC r**
Turn page edit mode off (default)	**ESC e "**
Turn page edit mode on	**ESC e #**

When insert mode is off, each character entered replaces the existing character at the cursor position.

When insert mode is on, the character at the cursor position and any characters to the right on the same line move right for each character entered.

When page edit mode is off, the data that moves beyond the end of the line or beyond the start of a protected field is lost. When page edit mode is on, the data wraps to the next (unlocked) line; only data that moves past the end of the page is lost.

If protect mode is on, the page edit command is ignored. Turning on protect mode turns off page edit mode.

Inserting Space Characters

Insert space character at cursor position	**ESC Q**
Insert line of space characters	**ESC E**

When a line of space characters is inserted, the line that moves off the bottom of the page is lost. If protect mode is on, the command is ignored.

Inserting a Column

Insert column of null characters **ESC c M**

Data following the inserted column moves right one column. The command is ignored if a line is locked.

Deleting Data

Delete cursor character **ESC W**

This command deletes the cursor character, pulling the following characters on the line back toward the cursor position. A space character is added at the end of the line or in the last position before a protected field. If page edit mode is on, data wraps onto the line from the following lines.

Delete cursor line **ESC R**

This command deletes the entire cursor line, moving all following lines up one line and moving the cursor to the start of the line. If protect mode is on, the command is ignored.

Delete cursor column **ESC c J**

This command deletes the cursor column, pulling the following columns left one column. The command is ignored if a line is locked.

Clearing Data

Clearing a Page

Clear page to null characters	**ESC ***
Clear page to space characters	**ESC +**
Clear page to write-protected space characters	**ESC ,**
Clear unprotected page to space characters	**ESC ;** or **CTRL Z**
Clear unprotected page to null characters	**ESC :**
Clear unprotected page to a specified character	**ESC . char**

char is the character that replaces unprotected characters.

Executing these commands also homes the cursor and turns off protect mode.

Clearing to the End of a Page or Line

Clear unprotected page to space characters from cursor	**ESC Y**
Clear unprotected page to null characters from cursor	**ESC y**
Clear unprotected line to space characters from cursor	**ESC T**
Clear unprotected line to null characters from cursor	**ESC t**

These commands replace unprotected characters from the cursor position to the end of the page or line, or the start of a protected field.

Clear unprotected to end of line with null characters **ESC c L**

This command replaces all unprotected characters from the cursor to the end of the line (skipping over protected fields).

Clearing a Column

Clear unprotected column to null characters	**ESC c K**
Clear unprotected column to specific character	**ESC c I char**

char is the character that replaces the unprotected characters in the cursor column.

These commands fill the cursor column on the entire page. The command is ignored if a line is locked.

Boxing and Clearing a Rectangle

Box rectangle — **ESC c G line col**

line and col are values from the ASCII line and column code tables in Appendix I that define the outside dimensions of the rectangle.

This command draws a box around an area of the page defined by a horizontal line from the cursor position to the specified column and by a vertical line from the cursor position to the specified line. The rectangle can extend to the right or left, above or below the cursor position, but it's limited to the current page.

If you define a rectangle that encompasses a locked line, the command is ignored.

The cursor doesn't move when the command is executed.

Clear unprotected rectangle — **ESC c F line col char**
Clear entire rectangle — **ESC c H line col char**

line is a value from Table I-1.
col is a value from Table I-2.
char is the character that replaces the characters within the area of the rectangle.

The command is ignored if a line is locked.

SENDING DATA

You can define the extent of the data affected by the print and send commands described in this section.

Defining Print/Send Operations

Begin print/send operations at top of page (default)	**ESC d &**
Begin print/send operations at top of screen	**ESC d '**
End print/send operations at cursor (default)	**ESC e D**
End print/send operations at end of page/line	**ESC e E**
Define SEND key to send line	**ESC e :**
Define SEND key to send page (default)	**ESC e ;**

Sending Data in Block Mode

When you send data in block mode to either the computer or the printer,

- o The terminal automatically includes end-of transmission delimiters (terminators) according to the value selected for the BLK END parameter in setup mode.
- o If protect mode is on, graphics characters are sent as space characters.
- o Null characters are not sent.
- o Unless the beginning or end point is otherwise defined, data is sent from the start of the page or line up to and including the cursor position.

Sending a Character or Line

Send cursor character	ESC M
Send entire cursor line	ESC 6
Send unprotected cursor line	ESC 4

No delimiter is sent after the cursor character is sent.

Sending a Page

Send entire page	ESC 7
Send unprotected page	ESC 5

If you've split the screen horizontally, only data from the active window is sent.

Sending a Block--To send a block of data,

1. Mark the beginning and end of the block with STX and ETX characters

2. Send the block to the computer

Mark block beginning with STX	ESC 8
Mark block end with ETX	ESC 9

These sequences place a visible STX or ETX character at the cursor location.

Send entire block	ESC s
Send unprotected characters	ESC S

These commands send the data between the first STX character left of the cursor and the first ETX character. (The STX and ETX characters are not sent.)

When the entire block is sent, protected fields are bracketed with the ESC) code (write-protect on) and the ESC (code (write-protect off).

When only unprotected characters are sent, each protected field is replaced by the field separator code FS (CTRL \).

Interrupting a Transmission--Pressing the BREAK key sends a break signal to the computer. The break signal continues as long as the BREAK key is held down.

Printing Data

Figure 5-4 shows how the terminal handles data through the printer port.

To send data to the terminal's printer port,

- Send a page print command to print data from the terminal's display memory

- Turn on a print mode to print data coming from the computer

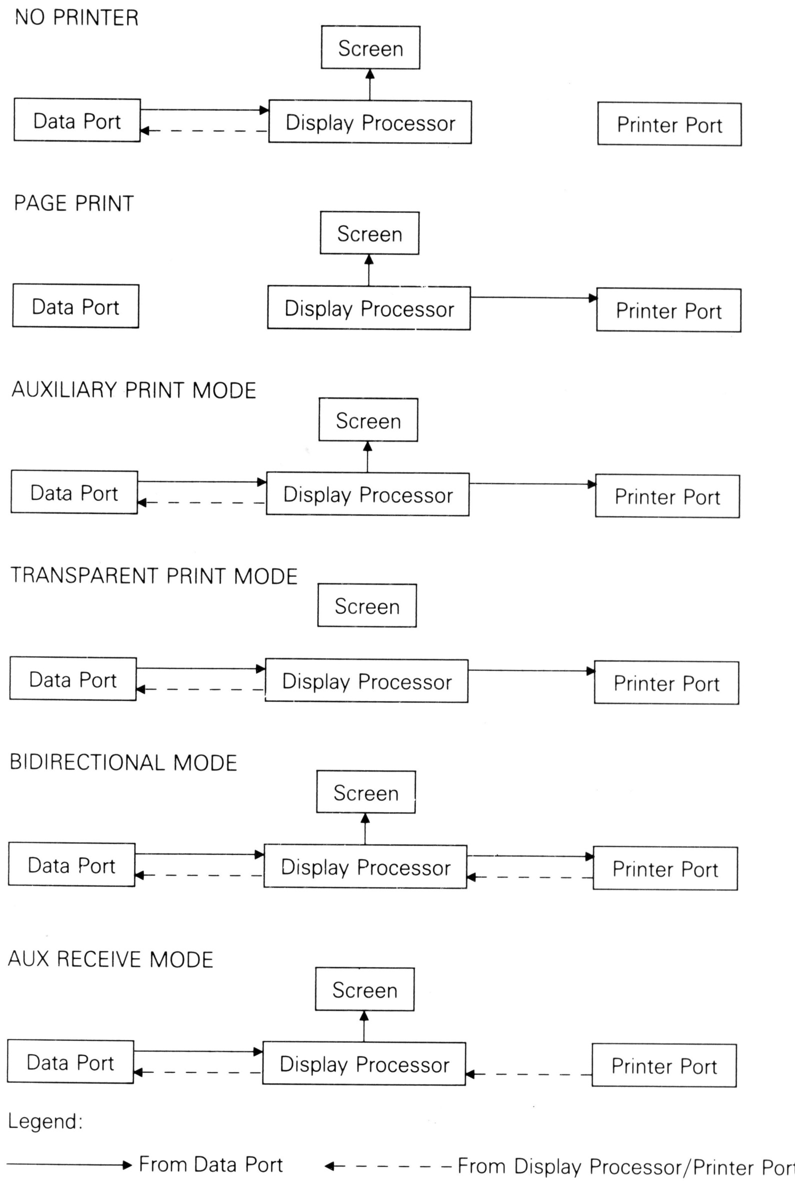
Page Print Commands--When you print from the terminal's display memory,

- The printed copy can duplicate the format seen on the screen (formatted page) or it can be unformatted (i.e., a string of data).

- When the terminal receives a command to print a formatted page, it includes the end-of-line delimiters CR, LF, and a null character in the data sent to the printer port.

- If ACK mode is on, the terminal sends an ACK to the computer at the end of a page print operation.

Figure 5-4 Communications through the Printer Port



Print entire formatted page	**ESC P**
Print formatted unprotected page	**ESC @**
Print unformatted page	**ESC p**
	or ESC L

No line terminators are sent with the unformatted page.

Print Modes--When one of the terminal's two buffered print modes is on, the terminal sends all data received from the computer to the printer port.

Turn print modes off (default)	**CTRL T**
Turn auxiliary print mode on	**CTRL R**
Turn transparent print mode on	**ESC d #**

In auxiliary print mode, the data is displayed on the screen; in transparent print mode, the data isn't displayed.

Bidirectional Communication--Data can flow in both directions between devices attached to the terminal's data port and printer port.

Turn secondary receive mode off (default)	**ESC d SPACE**
Turn secondary receive mode on	**ESC d !**

In secondary receive mode, data received by the terminal from a device connected to the printer port--such as a printer with a keyboard, or a bar code reader--is sent directly to the data port without affecting the screen display. Data received from the data port is displayed on the screen but is not sent to the printer port.

Turn bidirectional mode off (default)	ESC d **$**
Turn bidirectional mode on	ESC d **%**

Turning on bidirectional mode automatically turns on both secondary receive and auxiliary print modes. Data received by the data port is displayed on the screen and sent to the printer port. Data received by the printer port is sent directly to the data port without affecting the screen display.

Turning off bidirectional mode turns off secondary receive mode and all print modes.

6 DISPLAYING CHARACTER SETS

Primary and Secondary Character Sets 6-1
Selecting the Primary or Secondary Character Set 6-2
Default Character Sets 6-3
Defining the Primary and Secondary Character Sets 6-3
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The characters displayed by the terminal are organized into seven predefined character sets, each having room for 128 characters. Four of these character sets at a time (a maximum 512 characters) can be loaded into the terminal's "font banks," where they're available for display as a "primary" and "secondary" character set.

PRIMARY AND SECONDARY CHARACTER SETS

The terminal's primary and secondary character sets contain the characters to be currently displayed by the terminal in response to received codes.

With the commands described in this chapter, you can

- Choose four of the seven predefined character sets to load into the terminal's font banks
- Define one of the four font banks as your primary character set and another as your secondary character set
- Shift back and forth between the primary and secondary character sets to display the characters residing in each
- Design new characters and load them into any of the font banks

Selecting the Primary or Secondary Character Set

Select primary character set (default)	**ESC c D**
Select secondary character set	**ESC c E**

These commands select the primary or secondary character set for display.

Example--To display the Greek letter pi (π) that resides in the terminal's default secondary character set,

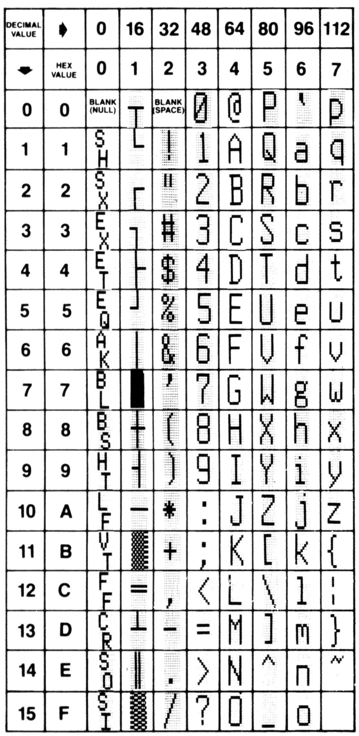
1. Send ESC c E to select the secondary character set.
2. Find the hex value (00 through 7F) of the character's position in the character set: Read across to the hex value at the top of the secondary character set in Figure 6-1, then down to the hex value in the vertical column.
3. Send 63H to display the character.
4. Send ESC c D to select the primary character set again.

Default Character Sets

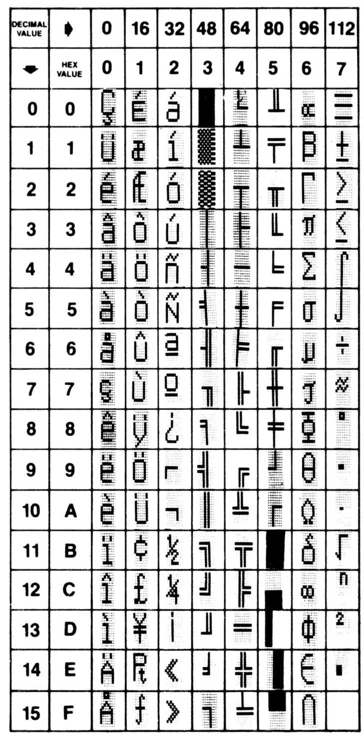
Figure 6-1 shows the terminal's default primary and secondary character sets. (See Appendix F for the default character sets displayed in other terminal personalities.)

Figure 6-1 Default Primary and Secondary Character Sets

Primary



Secondary



Defining the Primary and Secondary Character Sets

Define primary character set	**ESC c B <u>bank</u>**
Define secondary character set	**ESC c C <u>bank</u>**

bank is one of the terminal's font banks, each holding a predefined character set.

bank	Font Bank
0	Font bank 0
1	Font bank 1
2	Font bank 2
3	Font bank 3

Note--After defining the primary and secondary character sets, you still need to select one of them for display.

In the terminal's native mode,

- o The default primary character set (Figure 6-1) is stored in font bank 0.
- o The default secondary character set is stored in font bank 1.
- o The character sets held in reserve in font banks 2 and 3 contain the same characters as font banks 0 and 1, but in the compressed font designed for a 42- or 43-line display.

Automatic Font Loading

Turn automatic font loading off **ESC e N**
Turn automatic font loading on (default) **ESC e O**

Unless you turn off automatic font loading, the terminal automatically loads the font banks with the fonts appropriate to the number of lines displayed and to the terminal's current personality. (While the terminal is loading the fonts, the display may go blank for a few seconds.)

When automatic font loading is off, the terminal doesn't change the fonts--you are responsible for loading the font banks.

LOADING THE FONT BANKS

Load font bank with predefined character set	ESC c @ bank set
Clear font bank	ESC c ? bank

bank	Font Bank
0	0
1	1
2	2
3	3

set	Predefined Character Set
@	Native mode
A	Multinational
B	Standard ASCII
C	Graphics 1
D	PC equivalent
E	Graphics 2
F	Graphics 3
`	44-line native mode
a	44-line multinational
b	44-line PC equivalent

Figure 6-2 shows the predefined character sets.

If ACK mode is on, the terminal sends an ACK character to the computer after loading or clearing a font bank.

Note--If you clear a font bank from the activated primary or secondary character set, the screen blanks until you load the font bank again.

Figure 6-2 Predefined Character Sets

DECIMAL VALUE	↓	0	16	32	48	64	80	96	112
←	HEX VALUE	0	1	2	3	4	5	6	7
0	0	BLANK (NULL)	┬	BLANK (SPACE)	Ø	@	P	`	p
1	1	SH	└	!	1	A	Q	a	q
2	2	SX	┌	"	2	B	R	b	r
3	3	EX	┐	#	3	C	S	c	s
4	4	ET	├	$	4	D	T	d	t
5	5	EQ	┘	%	5	E	U	e	u
6	6	AK	│	&	6	F	V	f	v
7	7	BL	█	'	7	G	W	g	w
8	8	BS	┼	(	8	H	X	h	x
9	9	HT	┤	)	9	I	Y	i	y
10	A	LF	─	*	:	J	Z	j	z
11	B	VT	▓	+	;	K	[	k	{
12	C	FF	═	,	<	L	\	l	¦
13	D	CR	┴	-	=	M	]	m	}
14	E	SO	‖	.	>	N	^	n	~
15	F	SI	▒	/	?	O	_	o	

Native Mode

DECIMAL VALUE	↓	0	16	32	48	64	80	96	112
←	HEX VALUE	0	1	2	3	4	5	6	7
0	0	Ç	É	á	█	└	╨	α	≡
1	1	ü	æ	í	▓	┴	╤	β	±
2	2	é	Æ	ó	▒	┬	╥	Γ	≥
3	3	â	ô	ú	│	├	╙	π	≤
4	4	ä	ö	ñ	┤	─	╘	Σ	⌠
5	5	à	ò	Ñ	╡	┼	╒	σ	⌡
6	6	å	û	ª	╢	╞	╓	µ	÷
7	7	ç	ù	º	╖	╟	╫	τ	≈
8	8	ê	ÿ	¿	╕	╚	╪	Φ	°
9	9	ë	Ö	⌐	╣	╔	┘	Θ	∙
10	A	è	Ü	¬	║	╩	┌	Ω	·
11	B	ï	¢	½	╗	╦	█	δ	√
12	C	î	£	¼	╝	╠	▄	∞	^{n}
13	D	ì	¥	¡	╜	═	▌	φ	^{2}
14	E	Ä	₧	«	╛	╬	▐	ε	■
15	F	Å	ƒ	»	┐	╧	▀	∩	

Multinational

Figure 6-2 Continued

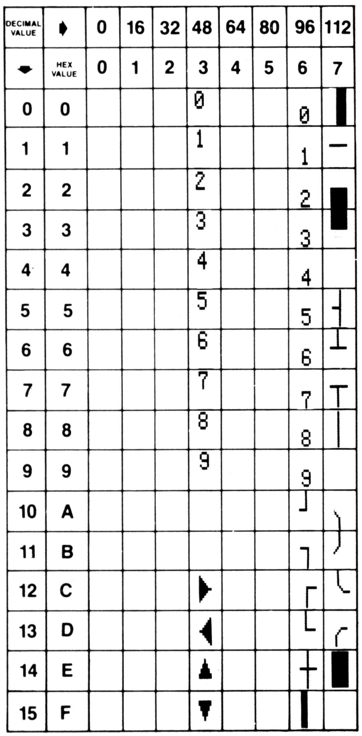
DECIMAL VALUE	⬧	0	16	32	48	64	80	96	112
⬅	HEX VALUE	0	1	2	3	4	5	6	7
0	0	BLANK (NULL)	►	BLANK (SPACE)	0	@	P	`	p
1	1	☺	◄	!	1	A	Q	a	q
2	2	☻	↕	"	2	B	R	b	r
3	3	♥	‼	#	3	C	S	c	s
4	4	♦	¶	$	4	D	T	d	t
5	5	♣	§	%	5	E	U	e	u
6	6	♠	▬	&	6	F	V	f	v
7	7	•	↨	'	7	G	W	g	w
8	8	◘	↑	(	8	H	X	h	x
9	9	○	↓	)	9	I	Y	i	y
10	A	◙	→	*	:	J	Z	j	z
11	B	♂	←	+	;	K	[	k	{
12	C	♀	∟	,	<	L	\	l	¦
13	D	♪	↔	-	=	M	]	m	}
14	E	♫	▲	.	>	N	^	n	~
15	F	☼	▼	/	?	O	_	o	

PC Equivalent

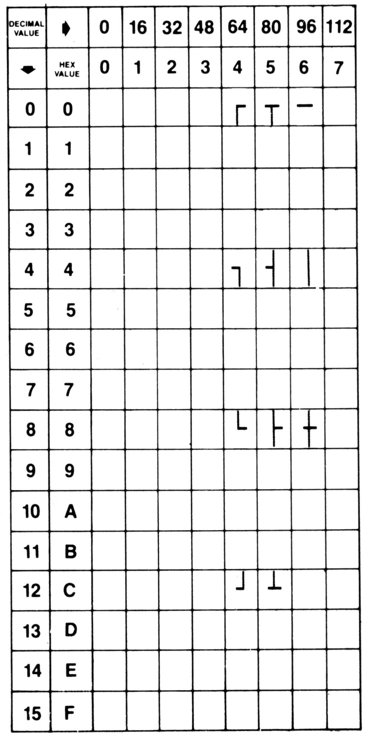
DECIMAL VALUE	⬧	0	16	32	48	64	80	96	112
⬅	HEX VALUE	0	1	2	3	4	5	6	7
0	0	BLANK (NULL)	DL	BLANK (SPACE)	0	@	P	`	p
1	1	SH	D1	!	1	A	Q	a	q
2	2	SX	D2	"	2	B	R	b	r
3	3	EX	D3	#	3	C	S	c	s
4	4	ET	D4	$	4	D	T	d	t
5	5	EQ	NK	%	5	E	U	e	u
6	6	AK	SY	&	6	F	V	f	v
7	7	BL	EB	'	7	G	W	g	w
8	8	BS	CN	(	8	H	X	h	x
9	9	HT	FM	)	9	I	Y	i	y
10	A	LF	SB	*	:	J	Z	j	z
11	B	VT	EC	+	;	K	[	k	{
12	C	FF	FS	,	<	L	\	l	¦
13	D	CR	GS	-	=	M	]	m	}
14	E	SO	RS	.	>	N	^	n	~
15	F	SI	US	/	?	O	_	o	

Standard ASCII

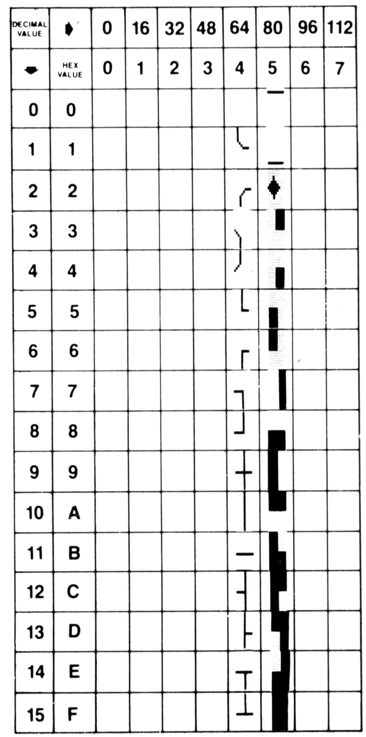
Figure 6-2 Continued



Graphics 1



Graphics 2



Graphics 3

DESIGNING AND LOADING CHARACTERS

To design and load a character,

1. Load one of the font banks with the predefined character set that will contain the character.

2. Select the character position where the character will reside in the character set (00H through 7FH).

3. Design the character and define its bit pattern in hexadecimal equivalents.

4. Send the escape sequence that defines and loads the character.

Defining and Loading a Character

Define and load character **ESC c A <u>bank</u> <u>pp</u> <u>bb...bb</u> CTRL Y**

<u>bank</u> is the font bank (0 through 3) where the character will reside.
<u>pp</u> is the 2-byte hex value of the character's position in the character set.
<u>bb...bb</u> is a 32-byte character string that defines the bit pattern of the character.

The command aborts if CTRL Y is sent before all 32 values of <u>bb...bb</u> are included. (Details on <u>bb...bb</u> are given in the following section.)

Your defined characters remain in the character set until

- You turn the power off.

- You reload or clear the font bank containing the character.

- You change to another terminal personality, or change between a 26-line and 44-line display, while automatic font load is on.

Designing the Character

Character Dimensions--The format of the screen defines the dimensions of the character cell.

- A 26-line screen displays a 7 x 12 character matrix in a cell measuring 10 x 16 pixels when the screen is 80 columns wide and a cell measuring 9 x 16 pixels when the screen contains 132 columns.

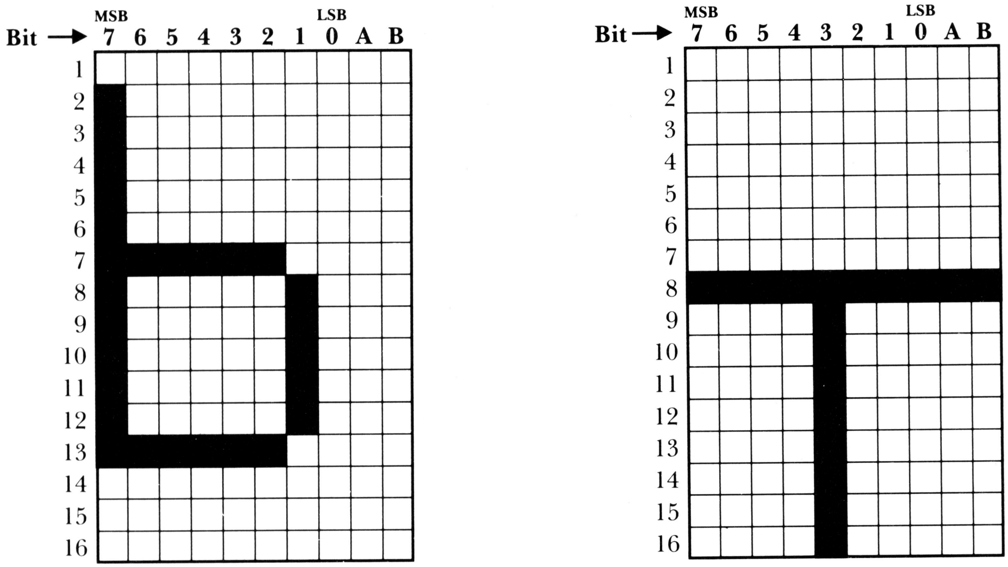
- A 44-line screen displays a 5 x 7 character matrix in a cell measuring 10 x 9 pixels on an 80-column screen and 9 x 9 pixels on a 132-column screen.

Figure 6-3 illustrates a 7 x 12 lowercase alphabetic character and a 10 x 9 line-drawing character, each in a 10 x 16 cell.

Notice that the alphanumeric character is confined to the seven leftmost boxes of the cell, whereas the graphics character extends across the whole cell. The terminal automatically extends whatever is in column 0 to columns A and B as well, causing consecutive characters to touch and allowing you to create graphic shapes with adjoining characters.

In designing alphanumeric characters, leave column 0 blank to reserve space between the characters. Likewise, reserve at least one line at the top or bottom of the cell to provide vertical space between the characters.

Figure 6-3 **Sample Predefined Characters in 10 x 16 Cell**



Procedure--To design a character,

1. Map the character on a grid representing the cell matrix.

2. Mark the grid with 1's and 0's representing the bit pattern.

3. Convert the bit pattern of each horizontal line of the matrix into hexadecimal equivalents and combine them in a string that completely describes the character.

Example--Figure 6-4 illustrates the first two steps in designing the lowercase "b" shown in Figure 6-3:

1. Mark the appropriate boxes on the grid to delineate the character.

2. Translate the pattern into bit values: Write a 1 in each box marked for the character; write a 0 in each unmarked box in the cell matrix.

Figure 6-4 Delineating a Character

Bit →	7 (MSB)	6	5	4	3	2	1	0 (LSB)	A	B
1										
2	X									
3	X									
4	X									
5	X									
6	X									
7	X	X	X	X	X	X				
8	X						X			
9	X						X			
10	X						X			
11	X						X			
12	X						X			
13	X	X	X	X	X	X				
14										
15										
16										

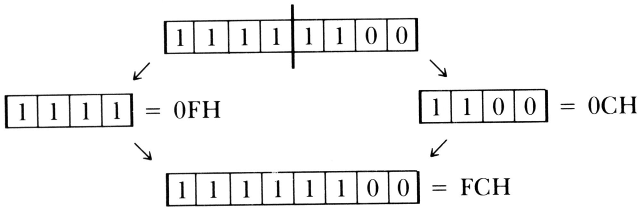
Bit →	7 (MSB)	6	5	4	3	2	1	0 (LSB)	A	B
1	0	0	0	0	0	0	0	0	0	0
2	1	0	0	0	0	0	0	0	0	0
3	1	0	0	0	0	0	0	0	0	0
4	1	0	0	0	0	0	0	0	0	0
5	1	0	0	0	0	0	0	0	0	0
6	1	0	0	0	0	0	0	0	0	0
7	1	1	1	1	1	1	0	0	0	0
8	1	0	0	0	0	0	1	0	0	0
9	1	0	0	0	0	0	1	0	0	0
10	1	0	0	0	0	0	1	0	0	0
11	1	0	0	0	0	0	1	0	0	0
12	1	0	0	0	0	0	1	0	0	0
13	1	1	1	1	1	1	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0

You now have a binary value for each of the 16 horizontal lines.

To convert these binary values to hex equivalents that define the line's pattern for the terminal, it is convenient to divide the line into two 4-bit "nibbles" and assign a hex value to each. (Columns A and B may be ignored, as they are always an extension of the values in Column 0.)

Figure 6-5 illustrates this principle for line 7 in Figure 6-4.

Figure 6-5 Dividing the Line



3. Divide each horizontal line into two four-bit "nibbles" and find the hex equivalent for each in Table 6-1.

Table 6-1 Hex Equivalents of Bit Patterns

Bit Pattern	Hex Equivalent	Bit Pattern	Hex Equivalent
0 0 0 0	0	1 0 0 0	8
0 0 0 1	1	1 0 0 1	9
0 0 1 0	2	1 0 1 0	A
0 0 1 1	3	1 0 1 1	B
0 1 0 0	4	1 1 0 0	C
0 1 0 1	5	1 1 0 1	D
0 1 1 0	6	1 1 1 0	E
0 1 1 1	7	1 1 1 1	F

4. Write down the hex values for each line. Figure 6-6 shows the result.

Figure 6-6 Line Values

Bit →	3	2	1	0	3	2	1	0	A	B	Hex Equivalent
1	0	0	0	0	0	0	0	0	0	0	00
2	1	0	0	0	0	0	0	0	0	0	80
3	1	0	0	0	0	0	0	0	0	0	80
4	1	0	0	0	0	0	0	0	0	0	80
5	1	0	0	0	0	0	0	0	0	0	80
6	1	0	0	0	0	0	0	0	0	0	80
7	1	1	1	1	1	1	0	0	0	0	FC
8	1	0	0	0	0	0	1	0	0	0	82
9	1	0	0	0	0	0	1	0	0	0	82
10	1	0	0	0	0	0	1	0	0	0	82
11	1	0	0	0	0	0	1	0	0	0	82
12	1	0	0	0	0	0	1	0	0	0	82
13	1	1	1	1	1	1	0	0	0	0	FC
14	0	0	0	0	0	0	0	0	0	0	00
15	0	0	0	0	0	0	0	0	0	0	00
16	0	0	0	0	0	0	0	0	0	0	00

5. The result is the 32-character string defining the softfont (from top to bottom):

   0 0 8 0 8 0 8 0 8 0 8 0 F C 8 2 8 2 8 2 8 2 8 2 F C 0 0 0 0 0 0

6. To load the lowercase "b" into its default position, the entire sequence is

   ESC c A 0 62 00 80 80 80 80 80 FC 82 82 82 82 82 FC
   00 00 00 CTRL Y

APPENDIX A SPECIFICATIONS

Screen	14-in (35.56 cm) flat screen (measured diagonally). Phosphor: P-31 green, P134 amber, or P188 white. Swivel: 360°; tilt: -7° to +34°. Option: Height-adjustable arm.
Display Format	26 or 44 lines (24/25/42/43 data lines); 80 or 132 columns; horizontally split screen.
Character Formation	26 lines: 7 x 12 matrix, 10 x 16 cell with 3-dot descenders. 44 lines: 5 x 7 matrix, 10 x 9 cell with 1-dot descenders.
Character Sets	US ASCII: 512 characters, seven selectable character sets (ASCII characters, control code symbols, graphics characters). Options: United Kingdom, French International, German, Spanish, Danish.
Cursor Control	Home, up, down, left, right, tab, carriage return.
Cursor Attributes	Block/underline; blinking/steady; off.
Print Capabilities	Page print (formatted/unformatted), auxiliary print, transparent print, bidirectional/secondary receive modes.

Communications Interfaces	Two interchangeable, buffered, bidirectional RS-232C ports (MODEM, AUX).
Communications Modes	Block, half duplex, full duplex, and half-duplex block.
Word Structure	7 or 8 data bits; 1 or 2 stop bits.
Parity	Odd, even, mark, or none.
Communications Protocol	MODEM and AUX ports: independent transmit (X-on/X-off or none) and receive (X-on/X-off, DTR, both, or none).
Baud Rates	MODEM port: 15 (50 to 38.4K). AUX port: 14 (110 to 19.2K).
Video Attributes	Hidden and nonhidden: normal, dim, blink, blank, bold, underline, and reverse (combinable). Double-wide, double-high, dim, bold, invisible line attributes.
Editing Functions	Insert character/line/column, delete character/line/column; clear page/line/column; clear/box rectangle; insert/replace; Wyseword.
Keyboards	Low-profile detached with 6-foot (1.83m) 4-wire coiled cable; two-position tilt (low position meets DIN specification); N-key rollover with ghost key lockout; sculpted keycaps.

WY-60 ASCII	101 keys, including 16 programmable function keys (shiftable to 32), and numeric keypad.
IBM RT/316X-Style	106 keys, including 16 programmable function keys (shiftable to 32), and numeric keypad.
AT-Style	84 keys, including 10 programmable function keys, and numeric keypad.

Fields Normal and protected.

Memory Four pages of 24 lines by 80/132 columns in nonhidden attribute modes, two pages in hidden attribute modes; seven pages of 24 lines by 80 columns in economy 80-column mode (nonhidden attributes), three pages in hidden attribute modes.

Personalities WY-60, WY-50, WY-50+, Lear Siegler ADM 3A/5/31, ADDS Viewpoint A2/60, DASHER D100/D200, Hazeltine HZ-1500, IBM 3101-1X/3101-2X, PC, AT, TeleVideo 910/910+/912/920/925/950/955.

Power Requirements 115 VAC, 60 Hz (U.S.); 230 VAC, 50 Hz.

Weight Net: 19 lbs. (8.6 kg).
Shipping: 24 lbs. (11.6 kg).

Dimensions

	Height (in)	**Height (cm)**	**Width (in)**	**Width (cm)**	**Depth (in)**	**Depth (cm)**
Terminal	12.75	31.8	12.5	29.2	13.0	33.0

	Height		Width		Depth	
	(in)	(cm)	(in)	(cm)	(in)	(cm)
Keyboards:						
WY-60 ASCII	2.25	5.72	17.25	43.82	7.6	19.3
IBM RT/316X-Style	2.25	5.72	18.7	47.6	6.9	17.6
AT-Style	2.4	3.6	17.7	44.9	5.6	14.2

APPENDIX B CONNECTOR PIN ASSIGNMENTS

Figure B-1 Pin Numbers (MODEM and AUX ports)

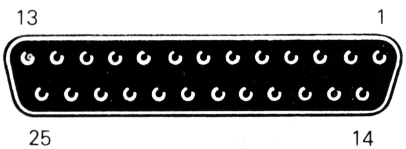


Table B-1 MODEM Port Connector Pin Assignments (DTE)

Pin	Signal	Mnemonic	Direction
1	Shield Ground	PGND	
2*	Transmit Data	TXD	Out
3*	Receive Data	RXD	In
4	Request to Send	RTS	Out
5+	Clear to Send	CTS	In
6+	Data Set Ready	DSR	In
7*	Signal Ground	SGND	
8+	Data Carrier Detect	DCD	In
20*	Data Terminal Ready	DTR	Out

---

* Typical requirement.

\+ Modem protocol. We recommend you leave it disconnected. If pin 5 is low, the terminal won't transmit any data. If pin 8 is low, the terminal won't receive any data.

Table B-2 Typical Modem Pin Assignments

Terminal (DTE)	Hayes Smartmodem 1200 (DCE)
1	1
2	2
3	3
7	7
20	20

We recommend that pins 6 and 8 be disconnected, as they are modem protocols that may lock up the terminal.

Note--Hayes Smartmodem 1200 front panel switch settings are DUDUDDUD.

Table B-3 AUX Port Connector Pin Assignments (DCE)

Pin	Signal	Mnemonic	Direction
1	Shield Ground	PGND	
2*	Transmit Data	TXD	In
3*	Receive Data	RXD	Out
6	Data Set Ready	DSR	Out
7*	Signal Ground	SGND	
20*	Data Terminal Ready	DTR	In

* Typical configuration

APPENDIX C KEY CODES

This appendix gives the codes for the editing keys, function keys, and other special keys, as follows:

Table C-1 Editing and Special Key Codes--WY-60 ASCII Keyboard

Table C-2 Editing and Special Key Codes--IBM RT/316X-Style Keyboard

Table C-3 Editing and Special Key Codes--PC- and AT-Style Keyboards

Table C-4 Function Key Default Codes

Table C-5 Key Codes in Application Key Mode

Wyseword key codes are listed in Appendix D.

Table C-1 Editing and Special Key Codes—WY-60 ASCII Keyboard

Key	Native[1] Code	Hex. Value	ADDS VP 60	ADDS VP A2
BACKSPACE	CTRL H	08	CTRL H	CTRL H
CLR LINE	ESC T	1B 54	ESC K	ESC K
CLR SCRN	ESC Y	1B 59	ESC k	ESC k
CURSOR DOWN	CTRL J[3]	0A	CTRL J	CTRL J
CURSOR LEFT	CTRL H	08	CTRL U	CTRL U
CURSOR RIGHT	CTRL L	0C	CTRL F	CTRL F
CURSOR UP[4]	CTRL K	0B	CTRL Z	CTRL Z
DEL	DEL	7F	DEL	DEL
DEL CHAR	ESC W	1B 57	ESC E	ESC N
DEL LINE	ESC R	1B 52	ESC l	ESC l
ENTER[5]	CTRL M or CTRL M CTRL J or CTRL I	0D 0D 0A 09	CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I
ESC	CTRL [	1B	CTRL [	CTRL [
HOME	CTRL ^	1E	CTRL A	CTRL A
SHIFT HOME	ESC {	1B 78	CTRL A	CTRL A
INS	ESC q	1B 71	ESC f	ESC q
INS CHAR	ESC Q	1B 51	ESC F	ESC Q
INS LINE	ESC E	1B 45	ESC M	ESC E
PAGE NEXT	ESC K	1B 45	ESC J	ESC J
PAGE PREV	ESC J	1B 4A	ESC J	ESC J

1. These codes are also recognized in WY-50+, ADM 31, and TeleVideo 910/920/925/950/955 modes. Unless otherwise noted, shifted keys send same code as unshifted.
2. In PC and AT modes, each key sends one code when pressed, and another code when released. (The high bit is set when the key is released.)
3. CTRL V if the terminal is in TeleVideo 925, 950, or 955 mode.
4. Shifted key sends ESC j in TeleVideo 925, 950, or 955 mode.
5. Shifted key sends no code (toggles keyclick).
6. Or IBM send code as defined.

DASHER D200 Unshifted	DASHER D200 Shifted	IBM	HZ-1500	PC/AT Scan Codes[2] PC DN	PC UP	AT DN	AT UP
CTRL Y	CTRL Y	CTRL H	CTRL H	0E	8E	0F	8F
RS CTRL ^		ESC I	~CTRL O	46	C6	64	E4
	RS Z	ESC J	~CTRL X				
CTRL Z	RS CTRL Z	ESC B	~CTRL K	50	D0	62	E2
CTRL Y	RS CTRL Y	ESC D	CTRL H	4B	CB	5C	DC
CTRL X	RS CTRL X	ESC C	CTRL P	4D	CD	66	E6
CTRL W	RS CTRL W	ESC A	~CTRL L	48	C8	60	E0
DEL		DEL	DEL	53	D3	68	E8
RS]	RS]	ESC Q		45	C5	5F	DF
	RS Y	ESC O					
CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I or[6]	CTRL M or CTRL M CTRL J or CTRL I	4E	CE	6C	EC
CTRL [	CTRL [	CTRL [	CTRL [	01	B1	5A	DA
CTRL H		ESC H	~CTRL R	47	C7	5B	DB
	RS CTRL H	ESC H	~CTRL R				
	RS [	ESC P				69	E9
RS \				01	81	5A	DA
	RS X	ESC N	~CTRL Z				
		ESC !A		51	D1	67	E7
		ESC !A					

Table C-1 Continued

Key	Native[1] Code	Hex. Value	ADDS VP 60	ADDS VP A2
PRINT	ESC P	1B 50	ESC P	ESC P
REPL	ESC r	1B 72	ESC F	ESC r
RETURN	CTRL M	0D		CTRL M
	or CTRL M CTRL J	0D 0A		or CTRL M CTRL J
	or CTRL I	09		
SEND	ESC 7	1B 37	ESC 7	ESC 7
TAB	CTRL I	09	CTRL I	CTRL I
SHIFT TAB	ESC I	1B 49	ESC O	ESC O
CTRL				
LEFT SHIFT				
RIGHT SHIFT				
FUNCT				
CAPS LOCK				
SPACEBAR	SPACE	20	SPACE	SPACE
KPD -				

DASHER D200 Unshifted	Shifted	IBM	HZ-1500	PC/AT Scan Codes[2] PC DN	UP	AT DN	UP
	RS CTRL A	(local)	CTRL F	37	B7	6A	EA
RS _		ESC P				69	E9
CTRL J	RS CTRL Q	CTRL M or CTRL M CTRL J	CTRL M or CTRL M CTRL J	10	90	2B	AB
CTRL M			~7				
CTRL I		CTRL I	CTRL I	0F	8F	10	90
		ESC 2					
				1D	9D	1E	9E
				2A	AA	2C	AC
				36	B6	39	B9
				38	B8	3A	BA
				3A	BA	40	C0
SPACE	SPACE	SPACE	SPACE	39	B9	3D	BD
				4A	CA	6B	EB

Table C-2 Editing and Special Key Codes—IBM RT/316X-Style Keyboard

Key	Native[1] Code	Hex. Value	ADDS VP 60	ADDS VP A2
BACKSPACE	CTRL H	08	CTRL H	CTRL H
CURSOR DOWN or LF	CTRL J[3]	0A	CTRL J	CTRL J
CURSOR LEFT	CTRL H	08	CTRL U	CTRL U
CURSOR RIGHT	CTRL L	0C	CTRL F	CTRL F
CURSOR UP[4]	CTRL K	0B	CTRL Z	CTRL Z
DEL	DEL	7F	DEL	DEL
DELETE	ESC W	1B 57	ESC E	ESC E
DEL LN	ESC R	1B 52	ESC l	ESC l
ENTER[5]	CTRL M or CTRL M CTRL J or CTRL I	0D 0D 0A 09	CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I
ERASE EOF	ESC T	1B 54	ESC K	ESC K
ER EOP	ESC Y	1B 59	ESC k	ESC k
ER INP			FF	FF
ESC	CTRL [	1B	CTRL [	CTRL [
HOME	CTRL ^	1E	CTRL A	CTRL A
SHIFT HOME	ESC {	1B 78	CTRL A	CTRL A
INSERT	ESC q	1B 71	ESC f	ESC q
INS LINE	ESC E	1B 45	ESC M	ESC M
SHIFT INSERT	ESC r	1B 72	ESC f	ESC r

1. These codes are also recognized in WY-50+, ADM 31, and TeleVideo 910/920/925/950/955 modes. Unless otherwise noted, shifted keys send the same code as unshifted.
2. In PC and AT modes, each key sends one code when pressed, and another code when released. (The high bit is set when the key is released.)
3. CTRL V if the terminal is in TeleVideo 925, 950, or 955 mode.
4. Shifted key sends ESC j in TeleVideo 925, 950, or 955 mode.
5. Shifted key sends no code (toggles keyclick).
6. Or IBM send code as defined.

DASHER D200				PC/AT Scan Codes[2]			
				PC		AT	
Unshifted	**Shifted**	**IBM**	**HZ-1500**	**DN**	**UP**	**DN**	**UP**
CTRL Y	CTRL Y	CTRL H	CTRL H	0E	8E	0F	8F
CTRL Z	RS CTRL Z	ESC B	~CTRL K	50	D0	62	E2
CTRL Y	RS CTRL Y	ESC D	CTRL H	4B	CB	5C	DC
CTRL X	RS CTRL X	ESC C	CTRL P	4D	CD	66	E6
CTRL W	RS CTRL W	ESC A	~CTRL L	48	C8	60	E0
DEL		DEL	DEL				
RS]	RS]	ESC Q		53	D3	68	E8
	RS Y	ESC O					
CTRL M	CTRL M	CTRL M	CTRL M	4E	CE	6C	EC
or CTRL M	or CTRL M	or CTRL M	or CTRL M				
CTRL J	CTRL J	CTRL J	CTRL J				
or CTRL I	or CTRL I	or CTRL I	or CTRL I				
		or[6]					
RS CTRL ^		ESC I	~CTRL O				
	RS Z	ESC J	~CTRL X				
		ESC K	~CTRL \				
CTRL [	CTRL [	CTRL [	CTRL [	01	B1	5A	DA
CTRL H		ESC H	~CTRL R	47	C7	5B	DB
	RS CTRL H	ESC H	~CTRL R				
	RS [	ESC P		52	D2	63	E3
	RS X	ESC N	~CTRL Z				
RS _		ESC P					

Table C-2 Continued

Key	Native[1] Code	Hex. Value	ADDS VP 60	ADDS VP A2
PAGE	ESC K	1B 45	ESC J	ESC J
SHIFT PAGE	ESC J	1B 4A	ESC J	ESC J
PRINT	ESC P	1B 50	ESC P	ESC P
RETURN	CTRL M or CTRL M CTRL J or CTRL I	0D 0D 0A		CTRL M or CTRL M CTRL J
SEND	ESC 7	1B 37	ESC DC1	ESC 7
TAB →	CTRL I	09	CTRL I	CTRL I
← TAB	ESC I	1B 49	ESC O	ESC O
RIGHT CTRL				
LEFT SHIFT				
LEFT CTRL				
RIGHT SHIFT				
SEND LINE	ESC 6			
SN MSG	ESC S			
JUMP				

7. Asterisk indicates the IBM line terminator character selected in setup mode.

DASHER D200 Unshifted	Shifted		IBM		HZ-1500	PC/AT Scan Codes[2] PC DN	UP	AT DN	UP
			ESC !A			45	C5	5F	DF
			ESC !A						
	RS CTRL Q		(local)		CTRL F	37	B7	6A	EA
CTRL J	CTRL M		CTRL M		CTRL M	10	90	2B	AB
		or	CTRL M CTRL J	or	CTRL M CTRL J				
RS CTRL Q					~7				
CTRL I			CTRL I		CTRL I	0F	BF	10	90
			ESC 2						
						1D	9D	1E	9E
						2A	AA	2C	AC
						38	B8	3A	BA
						36	B6	39	B9
			ESC ! B *[7]			46	C6	64	E4
			ESC SP 8 *[7]						
			ESC ~A			01	B1	5A	DA

Table C-3 Editing and Special Key Codes—PC- and AT-Style Keyboards[1]

Key	Native[2] Code	Hex. Value	ADDS VP 60	ADDS VP A2
←	CTRL H	08	CTRL H	CTRL H
CURSOR DOWN	CTRL J[4]	0A	CTRL J	CTRL J
CURSOR LEFT	CTRL H	08	CTRL U	CTRL U
CURSOR RIGHT	CTRL L	0C	CTRL F	CTRL F
CURSOR UP[5]	CTRL K	0B	CTRL Z	CTRL Z
DEL	DEL	7F	DEL	DEL
ENTER[6]	CTRL M or CTRL M CTRL J or CTRL I	0D 0D 0A 09	CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I
ESC	CTRL [	1B	CTRL [	CTRL [
HOME	CTRL ^	1E	CTRL A	CTRL A
INS	ESC q	1B 71	ESC f	ESC q
NUM LOCK				
PG DN	ESC K	1B 45	ESC J	ESC J
PG UP	ESC J	1B 4A	ESC J	ESC J
PRT SC	ESC P	1B 50	ESC P	ESC P

1. If NUM LOCK key is off.
2. These codes are also recognized in WY-50+, ADM 31, and TeleVideo 910/920/925/950/955 modes. Unless otherwise noted, shifted keys send the same code as unshifted.
3. In PC and AT modes, each key sends one code when pressed, and another code when released. (The high bit is set when the key is released.)
4. CTRL V if the terminal is in TeleVideo 925, 950, or 955 mode.
5. Shifted key sends ESC j in TeleVideo 925, 950, or 955 mode.
6. AT-style keyboard only; shifted key sends no code (toggles keyclick).
7. Or IBM send code as defined.

DASHER D200				PC/AT Scan Codes[3]			
				PC		AT	
Unshifted	Shifted	IBM	HZ-1500	DN	UP	DN	UP
CTRL Y	CTRL Y	CTRL H	CTRL H	0E	8E	0F	8F
CTRL Z	RS CTRL Z	ESC B	~CTRL K	50	D0	62	E2
CTRL Y	RS CTRL Y	ESC D	CTRL H	4B	CB	5C	DC
CTRL X	RS CTRL X	ESC C	CTRL P	4D	CD	66	E6
CTRL W	RS CTRL W	ESC A	~CTRL L	48	C8	60	E0
DEL		DEL	DEL	53	D3	68	E8
CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I	CTRL M or CTRL M CTRL J or CTRL I or[7]	CTRL M or CTRL M CTRL J or CTRL I	4E	CE	6C	EC
CTRL [	CTRL [	CTRL [	CTRL [	01	B1	5A	DA
CTRL H		ESC H	~CTRL R	47	C7	5B	DB
	RS [	ESC P		52	D2	63	E3
				45	C5	5F	DF
		ESC !A		51	D1	67	E7
		ESC !A		49	C9	65	E5
	RS CTRL Q	(local)	CTRL F	37	B7	6A	EA

Table C-3 Continued

Key		Native[2] Code	Hex. Value	ADDS VP 60		ADDS VP A2
RETURN[8]		CTRL M	0D			CTRL M
	or	CTRL M CTRL J	0D 0A		or	CTRL M CTRL J
	or	CTRL I	09			
SCROLL LOCK						
TAB		CTRL I	09	CTRL I		CTRL I
SHIFT TAB		ESC I	1B 49	ESC O		ESC O

8. PC-style keyboard only.

DASHER D200 Unshifted	DASHER D200 Shifted	IBM	HZ-1500	PC/AT Scan Codes[3] PC DN	PC UP	AT DN	AT UP
CTRL J	CTRL M	CTRL M or CTRL M CTRL J	CTRL M or CTRL M CTRL J	10	90	2B	AB
				46	C6	64	E4
CTRL I		CTRL I	CTRL I	0F	8F	10	90
		ESC 2					

Table C-4 Function Key Default Codes[1]

Key	Native Mode[2]	ADDS Modes	DASHER D200 Mode	IBM Modes[3]
F1	CTRL A @ CR	STX 1 CR	RS q	ESC a *
F2	CTRL A A CR	STX 2 CR	RS r	ESC b *
F3	CTRL A B CR	STX 3 CR	RS s	ESC c *
F4	CTRL A C CR	STX 4 CR	RS t	ESC d *
F5	CTRL A D CR	STX 5 CR	RS u	ESC e *
F6	CTRL A E CR	STX 6 CR	RS v	ESC f *
F7	CTRL A F CR	STX 7 CR	RS w	ESC g *
F8	CTRL A G CR	STX 8 CR	RS x	ESC h *
F9	CTRL A H CR		RS y	ESC i *
F10	CTRL A I CR		RS z	ESC j *
F11	CTRL A J CR		RS {	ESC k *
F12	CTRL A K CR		RS ¦	ESC l *
F13	CTRL A L CR		RS }	
F14	CTRL A M CR		RS ~	
F15	CTRL A N CR		RS p	
F16	CTRL A O CR		(none)	
SHIFT F1	CTRL A ` CR	STX ! CR	RS a	ESC ! a *
SHIFT F2	CTRL A a CR	STX " CR	RS b	ESC ! b *
SHIFT F3	CTRL A b CR	STX # CR	RS c	ESC ! c *
SHIFT F4	CTRL A c CR	STX $ CR	RS d	ESC ! d *
SHIFT F5	CTRL A d CR	STX % CR	RS e	ESC ! e *
SHIFT F6	CTRL A e CR	STX & CR	RS f	ESC ! f *
SHIFT F7	CTRL A f CR	STX ' CR	RS g	ESC ! g *
SHIFT F8	CTRL A g CR	STX (CR	RS h	ESC ! h *
SHIFT F9	CTRL A h CR		RS i	ESC ! i *

1. In PC and AT modes, the keys send scan codes, not ASCII characters.
2. Codes also recognized in ADM 31, HZ 1500, and TVI 910+/920/925/950/955 modes.
3. Asterisk indicates the line terminator selected in setup mode (ETX, CR, EOT, or XOFF).

Table C-4 Continued

Key	Native Mode[2]	ADDS Modes	DASHER D200 Mode	IBM Modes[3]
SHIFT F10	CTRL A i CR		RS j	ESC ! j *
SHIFT F11	CTRL A j CR		RS k	ESC ! k *
SHIFT F12	CTRL A k CR		RS l	ESC ! l *
SHIFT F13	CTRL A l CR		RS m	ESC ! m *
SHIFT F14	CTRL A m CR		RS n	ESC ! n *
SHIFT F15	CTRL A n CR		RS o	ESC ! o *
SHIFT F16	CTRL A o CR		(none)	

Table C-5 Key Codes in Application Key Mode[1]

Key	Hex Value	Key	Hex Value
Editing Keys -- WY-60 ASCII Keyboard			
CURSOR UP	D3	DEL CHAR	DD
CURSOR DOWN	D2	DEL LINE	F3
CURSOR RIGHT	D1	ENTER	BA
CURSOR LEFT	D0	SHIFT ENTER	BA
SHIFT CURSOR UP	D8	HOME	D4
SHIFT CURSOR DOWN	D7	SHIFT HOME	D9
SHIFT CURSOR RIGHT	D6	INS CHAR	DC
SHIFT CURSOR LEFT	D5	INS LINE	F2
CLR LINE	DE	INS	F5
CLR SCRN	F4	REPL	DF

1. These unique 8-bit codes override all other key codes when the terminal is in application key mode. The terminal and the computer must be in 8-bit data configuration.

Table C-5 Continued

Key	Hex Value	Key	Hex Value
Editing Keys -- IBM RT/316X-Style Keyboard			
CURSOR UP	D3	DELETE	DD
CURSOR DOWN	D2	CTRL DELETE	F3
CURSOR RIGHT	D1	ENTER	BA
CURSOR LEFT	D0	SHIFT ENTER	BA
SHIFT CURSOR UP	D8	HOME	D4
SHIFT CURSOR DOWN	D7	SHIFT HOME	D9
SHIFT CURSOR RIGHT	D6	CTRL INSERT	F2
SHIFT CURSOR LEFT	D5	INSERT	F5
ERASE EOF	DE	SHIFT INSERT	DF
SHIFT ERASE EOF	F4		
Editing Keys -- PC/AT-Style Keyboards[2]			
CURSOR UP	D3	DEL	DD
CURSOR DOWN	D2	ENTER	BA
CURSOR RIGHT	D1	SHIFT ENTER	BA
CURSOR LEFT	D0	HOME	D4
SHIFT CURSOR UP	D8	SHIFT HOME	D9
SHIFT CURSOR DOWN	D7	INS	F5
SHIFT CURSOR RIGHT	D6	SHIFT INS	DF
SHIFT CURSOR LEFT	D5		
Function Keys[3]			
CTRL F1	80	CTRL SHIFT F1	90
CTRL F2	81	CTRL SHIFT F2	91
CTRL F3	82	CTRL SHIFT F3	92

2. NUM LOCK off.
3. PC/AT-style keyboards have function keys F1 through F10 only.

Table C-5 Continued

Key	Hex Value	Key	Hex Value
CTRL F4	83	CTRL SHIFT F4	93
CTRL F5	84	CTRL SHIFT F5	94
CTRL F6	85	CTRL SHIFT F6	95
CTRL F7	86	CTRL SHIFT F7	96
CTRL F8	87	CTRL SHIFT F8	97
CTRL F9	88	CTRL SHIFT F9	98
CTRL F10	89	CTRL SHIFT F10	99
CTRL F11	8A	CTRL SHIFT F11	9A
CTRL F12	8B	CTRL SHIFT F12	9B
CTRL F13	8C	CTRL SHIFT F13	9C
CTRL F14	8D	CTRL SHIFT F14	9D
CTRL F15	8E	CTRL SHIFT F15	9E
CTRL F16	8F	CTRL SHIFT F16	9F

Numeric Keypad Keys[4]

Key	Hex Value	Key	Hex Value
0	B0	SHIFT 0	B0
1	B1	SHIFT 1	B1
2	B2	SHIFT 2	B2
3	B3	SHIFT 3	B3
4	B4	SHIFT 4	B4
5	B5	SHIFT 5	B5
6	B6	SHIFT 6	B6
7	B7	SHIFT 7	B7
8	B8	SHIFT 8	B8
9	B9	SHIFT 9	B9
,	CC	SHIFT ,	CC
-	CD	SHIFT -	CD
.	CE	SHIFT .	CE

4. On the PC/AT-style keyboards, NUM LOCK must be on.

APPENDIX D WYSEWORD COMMANDS

Table D-1 lists the WordStar-compatible commands executed by the terminal in Wyseword mode.

Note--On the PC- and AT-style keyboards, the numeric keypad keys function as described only if NUM LOCK is off.

Table D-1 Wyseword Commands

Command Description	WordStar Command	WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Move Cursor					
Right one character	^D	CURSOR RIGHT	CURSOR RIGHT	CURSOR RIGHT	CURSOR RIGHT
Left one character	^S	CURSOR LEFT	CURSOR LEFT	CURSOR LEFT	CURSOR LEFT
Up one line	^E	CURSOR UP	CURSOR UP	CURSOR UP	CURSOR UP
Down one line	^X	CURSOR DOWN	CURSOR DOWN	CURSOR DOWN	CURSOR DOWN
Right one word	^F	SHIFT 3_{kpd}	SHIFT 3_{kpd}		
Left one word	^A	SHIFT 1_{kpd}	SHIFT 1_{kpd}		
To next tab stop	^I	TAB	TAB	TAB	TAB
To top of screen, column 1	^QS^QE	HOME	HOME	HOME	HOME
To start of file	^QR	SHIFT HOME	SHIFT HOME	SHIFT HOME	SHIFT HOME

Table D-1 Continued

Command Description	WordStar Command	WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
To end of file	^QC	F15	F15	F2	F2
To start of line	^QS	SHIFT CURSOR LEFT	SHIFT CURSOR LEFT	SHIFT CURSOR LEFT	SHIFT CURSOR LEFT
To end of line	^QD	SHIFT CURSOR RIGHT	SHIFT CURSOR RIGHT	SHIFT CURSOR RIGHT	SHIFT CURSOR RIGHT
To find/replace text again	^L	SHIFT F5	SHIFT F5	SHIFT F5	SHIFT F5
To start of last find/replace	^QV	SHIFT 2_{kpd}	SHIFT 2_{kpd}		
To marked text	^Q (0–9)	F7 (0–9)	F7 (0–9)		
Scroll					
Up one line	^W	SHIFT CURSOR UP	SHIFT CURSOR UP	SHIFT CURSOR UP	SHIFT CURSOR UP
Down one line	^Z	SHIFT CURSOR DOWN	SHIFT CURSOR DOWN	SHIFT CURSOR DOWN	SHIFT CURSOR DOWN
To previous screen	^R	SHIFT PREV PAGE	SHIFT PAGE	PG UP	PG UP
To next screen	^C	NEXT PAGE	PAGE	PG DN	PG DN
Down continuously	^QZ	SHIFT PRINT	PRINT		
Find and Replace					
Find text	^QF	F5	F5	F5	F5
Find and replace text	^QA	F6	F6	F6	F6
Find/replace text again	^L	SHIFT F5	SHIFT F5	SHIFT F5	SHIFT F5

Table D-1 Continued

Command Description	WordStar Command	WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Return cursor to start of last find/replace	^QV	SHIFT 2_{kpd}	SHIFT 2_{kpd}		
File and Block Operations					
Change logged disk drive	^KL	SHIFT $,_{kpd}$	SHIFT $,_{kpd}$		
File directory on/off	^KF	SHIFT 0_{kpd}	SHIFT 0_{kpd}		
Print file	^KP	SHIFT $-_{kpd}$	SHIFT $-_{kpd}$	SHIFT $-_{kpd}$	SHIFT $-_{kpd}$
Turn column mode on/off	^KN	SHIFT INS	SHIFT INSERT		
Mark/unmark block beginning	^KB	F9	F9	F9	F9
Mark/unmark block end	^KK	SHIFT F9	SHIFT F9	SHIFT F9	SHIFT F9
Move block	^KV	F12	F12	F7	F7
Hide/show marked block	^KH	F10	F10	F10	F10
Delete block	^KY	SHIFT F10	SHIFT F10	SHIFT F10	SHIFT F10
Copy block	^KC	F11	F11	F8	F8
Write block into another file	^KW	SHIFT F11	SHIFT F11	SHIFT F8	SHIFT F8
Read file into document	^KR	SHIFT F12	SHIFT F12	SHIFT F7	SHIFT F7
Set/remove marker (0–9)	^K 0–9	SHIFT F7 (0–9)	SHIFT F7 (0–9)		
Save Files					
Save, resume edit	^KS^QP	SHIFT F4	SHIFT F4		

Table D-1 Continued

Command Description	WordStar Command	WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Save, return to opening menu	^KD	F1	F1	F1	F1
Save, exit to system	^KX	SHIFT F1	SHIFT F1		
Abandon edit	^KQ	SHIFT F2	SHIFT F2	SHIFT F1	SHIFT F1
Miscellaneous					
Interrupt command	^U	ESC	ESC	ESC	ESC
Repeat next command or character	^QQ	SHIFT .kpd	SHIFT .kpd		
Set help level	^JH	SHIFT F3	SHIFT F3	SHIFT F3	SHIFT F3
Format					
Turn on/off word wrap	^OW	SHIFT F13	SHIFT F13	SHIFT F4	SHIFT F4
Turn on/off justification	^OJ	SHIFT F14	SHIFT F14	SHIFT F6	SHIFT F6
Set left margin	^OL	SHIFT F15	SHIFT F15		
Set right margin	^OR	SHIFT F16	SHIFT F16		
Paragraph tab	^OG	SHIFT TAB	SHIFT TAB	SHIFT TAB	SHIFT TAB
Reformat paragraph	^B	F16	F16	SHIFT F2	SHIFT F2
Set tab	^OI	F13	F13		
Clear tab	^ON	F14	F14		
Center text	^OC	F8	F8		

Table D-1 Continued

Command Description	WordStar Command	WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Turn print control display on/off	^OD	SEND	SEND		
Delete and Insert					
Delete character	^G	DEL CHAR	DELETE	DEL	DEL
Delete line	^Y	SHIFT DEL LINE	CTRL DEL LN	SHIFT DEL	SHIFT DEL
Delete to end of line	^QY	CLR LINE	ERASE EOF		
Delete to start of line	^Q DEL	SHIFT DEL	SHIFT ERASE EOF		
Delete block	^KY	SHIFT F10	SHIFT F10	SHIFT F10	SHIFT F10
Turn insert mode on/off	^V	REPL	INSERT	INS	INS
Insert carriage return (blank line)	^N	INS LINE	CTRL INS LN	SHIFT INS	SHIFT INS
Print Commands					
Turn boldface on/off	^PB	F4	F4	F4	F4
Turn underline on/off	^PS	F3	F3	F3	F3
Turn double strike on/off	^PD	SHIFT 8_{kpd}	SHIFT 8_{kpd}		
Turn subscript on/off	^PV	SHIFT 4_{kpd}	SHIFT 4_{kpd}		
Turn superscript on/off	^PT	SHIFT 7_{kpd}	SHIFT 7_{kpd}		

Table D-1 Continued

Command Description	WordStar Command	WY-60 ASCII Keyboard	IBM RT/ 316X-Style Keyboard	AT-Style Keyboard	PC-Style Keyboard
Turn strikeout on/off	^PX	SHIFT 9_{kpd}	SHIFT 9_{kpd}		
Strikeover	^PH	SHIFT 5_{kpd}	SHIFT 5_{kpd}	SHIFT 5_{kpd}	
Enter nonbreak space	^PO	SHIFT 6_{kpd}	SHIFT 6_{kpd}		
Dot Commands					
Enter footer	.FO	SHIFT F6	SHIFT F6		
Enter header	.HE	SHIFT F8	SHIFT F8		
Enter unconditional page break	.PA	F2	F2		

APPENDIX E TERMINAL STATUS MESSAGES

Table E-1 Terminal Status Messages

Message	Meaning
FDX	The terminal is in full-duplex mode.
HDX	The terminal is in half-duplex mode.
BLK	The terminal is in block or half-duplex block mode.
<FDX[1] <HDX[1] <BLK[1]	The terminal is sending data to the computer while in the indicated communication mode.
HLD[1]	The corner key is engaged in its hold-screen function.
CONV[1]	The terminal is in ADDS VP-60 conversation mode.
MSG[1]	The terminal is in ADDS VP-60 message mode.
PAGE[1]	The terminal is in ADDS VP-60 page mode.
<AUX	The terminal is in secondary receive mode.
>AUX	The terminal is in auxiliary print or transparent print mode.
=AUX	The terminal is in bidirectional mode.
%AUX	The printer port is receiving data from the terminal's display memory.

1. These messages supersede FDX, HDX, BLK.

Table E-1 Continued

Message	Meaning
1...6	The terminal is displaying the indicated page. (No message appears when page 0 is displayed.)
hh:mm	The standard status line is displaying the current time (with an a.m. or p.m. indicator).
nn-nnn	The standard status line is displaying the cursor line and column numbers.
INS	Insert mode is on.
PROT	Protect mode is on.
WRPT	Write-protect mode is on (displayed only when protect mode is also on).
*	Monitor mode is on.[2]
w	Wyseword mode is on.
LOCK	The keyboard is locked.[3]
NUM	NUM LOCK is on (PC and AT keyboards).[4]
CAPS	The CAPS LOCK key is on.

2. If both monitor mode and Wyseword mode are on, the monitor mode indicator takes precedence over the Wyseword indicator.
3. The LOCK message takes precedence over the NUM or CAPS message.
4. The NUM message takes precedence over the CAPS message.

APPENDIX F OTHER TERMINAL PERSONALITIES

This appendix describes the terminal's operation in nonnative operating modes (personalities).

See the separate document, WY-60 Personalities, for a list of the commands supported in each personality.

Note--Key codes for the other personalities are included in the tables in Appendix C. Line and column codes are included in the tables in Appendix I.

CHARACTER SETS

Unless automatic font load is turned off, the terminal loads the character sets listed in Table F-1 when it enters another personality. The character sets are illustrated in Chapter 6.

Note--While the terminal is loading the fonts, the display may go blank for a few seconds.

Table F-1 Default Character Sets in Other Personalities

Personality	Primary Character Set	Secondary Character Set
WY50+	Native Mode	Multinational
TVI 910+	Native Mode	Multinational
TVI 925	Native Mode	Multinational
ADDS VP A2	Native Mode	Multinational
HZ 1500	Native Mode	Multinational

Table F-1 Continued

Personality	Primary Character Set	Secondary Character Set
TVI 912/920	Native Mode	Multinational
TVI 950	Native Mode	Multinational
DG200	Native Mode	Multinational
IBM 3101-1X	Standard ASCII	Graphics 1
ADM 31	Native Mode	Multinational
TVI 955	Standard ASCII	Graphics 3
PC Term	PC Equivalent	Multinational
AT Term	PC Equivalent	Multinational
IBM 3101-2X	Standard ASCII	Graphics 1
ADDS VP 60	Standard ASCII	Graphics 2

NONHIDDEN ATTRIBUTES

The following personalities have nonhidden (embedded) display attributes that appear on the screen as space characters:

- WY-50+
- ADM 31
- ADDS VP A2
- HZ 1500
- TVI 910+
- TVI 912/920
- TVI 925
- TVI 950

Nonhidden attributes affect some of the commands described in Chapter 5. The effects are listed in Table F-2 and explained in the following sections.

Table F-2 Command Variations in Nonhidden Attribute Modes

Command	Effect
ESC w length	More pages of memory are available.
ESC w page* ESC w @ page line col ESC - page line col	In commands that display pages or address the cursor to a specific page, page values can be 0 through 6, depending on the number of lines and the status of economy mode (see Table F-3).
ESC z field label CR	Function key labels are limited to eight characters for an 80-column screen.
ESC A field attr	All display attributes can be assigned to the data area field.
ESC G attr	Display attributes are assigned to the screen or line, not to a character or page.
ESC ! attr	A page can be cleared to a display attribute.

* Also available are local keyboard commands CTRL 4_{kpd}, CTRL 5_{kpd}, and CTRL 6_{kpd}, which display pages 4, 5, and 6.

More Pages of Memory

Table F-3 shows the number of pages available in the nonhidden attribute modes. (Table 5-4 summarizes the pages available in the hidden attribute modes.)

Note--The terminal supports only 24 lines to a page in all nonhidden attribute personalities except WY-50+.

Table F-3 Valid Page Configurations in Nonhidden Attribute Modes

Data Lines	Multiplier	80/132 Columns Lines/Page	Pages	Economy 80 Columns Lines/Page	Pages
24	1 x lines	24	4	24	7
	2 x lines	48	2	48	3
	4 x lines	96	1	96	1
	*	24 and 79	2	24 and 145	2
25	1 x lines	25	4	25	6
	2 x lines	50	2	50	3
	4 x lines	100	1	100	1
	*	25 and 78	2	25 and 144	2
42	1 x lines	42	2	42	4
	2 x lines	84	1	84	2
	4 x lines	NA		168	1
	*	42 and 61	2	42 and 127	2
43	1 x lines	43	2	43	3
	2 x lines	86	1	86	1
	*	43 and 60	2	43 and 126	2

Display Attributes

In the nonhidden attribute modes, you can assign all the display attributes in Table J-1 to the data area of the screen.

The ESC G attr command assigns the display attribute from the cursor position to the end of the screen (or line in line attribute mode).

Additional Command--The following command is available in the nonhidden attribute modes.

Clear unprotected page to display attribute **ESC ! _attr_**

The attribute replaces all unprotected characters on the page, regardless of the cursor's position, but is only displayed as data is entered.

Note--After you clear the page to any display attribute except the normal attribute, avoid entering data in the first position (line 1, column 1) or the attribute won't take effect in that line.

ADDITIONAL INFORMATION ON INDIVIDUAL PERSONALITIES

WY-50+ Mode

For complete compatibility with the WY-50+ terminal, enhance mode must be off.

ADDS VP-60 Mode

In ADDS VP-60 mode, the line terminator is selected by the VP60 BLK END parameter in setup mode.

DG200 Mode

In DG200 mode, leaving setup mode sets the END-OF-LINE WRAP parameter to "off" and disables protect mode.

The control sequence introducer "RS" is equivalent to "ESC."

IBM Modes

In the IBM modes, the line terminator character is selected by the BLOCK END parameter in setup mode.

BLOCK END Parameter Setting	Line Terminator Character
US/CR	CR
CRLF/ETX	ETX
IBM:XOFF	XOFF
IBM:EOT	EOT

Note--If US/CR is selected in an IBM mode, the terminal sends a CR when the RETURN key is pressed, regardless of the RETURN parameter setting.

In IBM 3101-2X mode, the SEND key's code is defined by the SEND parameter in setup mode.

SEND Parameter Setting	SEND Key Definition
PAGE	SEND key sends data from the page's home position through the cursor position.
LINE	SEND key sends data from the start of the cursor line through the cursor position.

Note--When the ENTER parameter in setup mode is set to IBM SEND, the ENTER key acts like the SEND key.

The NULL SUPPR parameter in setup mode controls the sending of null characters in the IBM modes.

NULL SUPPR Parameter Setting	Null Characters
OFF	Sent
ON	Not sent

PC and AT Modes

Keys send scan codes. No keys can be redefined in these personalities.

TeleVideo 955 Mode

The TVI 955 ATTRIBUTE parameter in setup mode controls whether display attributes are hidden or nonhidden in TVI 955 mode.

TVI 955 ATTRIBUTE Parameter Setting	Display Attributes
SPACE	Nonhidden
NO SPACE	Hidden

APPENDIX G CONTROL CODES AND ESCAPE SEQUENCES

This appendix lists the control codes (Table G-1) and escape sequences (Table G-2) recognized in the terminal's native mode.

Table G-1 Control Codes

CTRL Key	Hex Value	ASCII Char-acter	Symbol*	Action
@ or `	00	NUL		
A or a	01	SOH	S_H	
B or b	02	STX	S_X	
C or c	03	ETX	E_X	
D or d	04	EOT	E_T	
E or e	05	ENQ	E_Q	Send ACK (if ACK mode is on)
F or f	06	ACK	A_K	
G or g	07	BEL	B_L	Sound bell
H or h	08	BS	B_S	Cursor left
I or i	09	HT	H_T	Tab cursor
J or j	0A	LF	L_F	Cursor down (linefeed); scroll
K or k	0B	VT	V_T	Cursor up; no scroll
L or l	0C	FF	F_F	Cursor right
M or m	0D	CR	C_R	Cursor to start of line
N or n	0E	SO	S_O	Unlock keyboard
O or o	0F	SI	S_I	Lock keyboard
P or p	10	DLE	┬	
Q or q	11	DC1 (XON)	└	Enable transmission (when transmit handshake is X-on/X-off)
R or r	12	DC2	┌	Auxiliary print mode on

* Monitor mode symbols in terminal's native mode.

Table G-1 Continued

Control Key	Hex. Value	ASCII Character	Symbol*	Action
s	13	DC3 (XOFF)	┐	Stop transmission (when transmit handshake is X-on/X-off)
T or t	14	DC4	├	Turn all print modes off
U or u	15	NAK	┤	
V or v	16	SYN	│	
W or w	17	ETB	█	
X or x	18	CAN	┼	Transparent print on (if enhance mode is off)
Y or y	19	EM	┤	
Z or z	1A	SUB	─	Clear unprotected page to spaces
{ or [	1B	ESC	▒	Initiates escape sequence
¦ or \	1C	FS	═	
} or]	1D	GS	┴	
^ or ~	1E	RS	║	Home cursor
_ or DEL	1F	US	▒	Cursor to start of next line

Table G-2 Escape Sequences in ASCII Order

Escape Sequence	Action
ESC SPACE	Send terminal ID
ESC !	
ESC "	Unlock keyboard
ESC #	Lock keyboard
ESC $	
ESC %	
ESC &	Protect mode on
ESC '	Protect mode off
ESC (	Write-protect mode off
ESC)	Write-protect mode on

Table G-2 Continued

Escape Sequence	Action
ESC *	Clear page to nulls
ESC +	Clear page to spaces
ESC ,	Clear page to write-protected spaces
ESC - wnd/page line col	Address cursor in specific 80-column window/page
ESC . char	Clear unprotected page to specific character
ESC /	Read 80-column window/page and cursor address
ESC 0	Clear all tab stops
ESC 1	Set tab stop
ESC 2	Clear tab stop
ESC 3	
ESC 4	Send unprotected cursor line
ESC 5	Send unprotected page
ESC 6	Send entire cursor line
ESC 7	Send entire page
ESC 8	Mark block beginning
ESC 9	Mark block end
ESC :	Clear unprotected page to nulls
ESC ;	Clear unprotected page to spaces
ESC <	
ESC = line col	Address cursor in 80-column current page
ESC >	
ESC ?	Read cursor address in 80-column page
ESC @	Print formatted unprotected page
ESC A field attr	Assign display attributes to message field
ESC B	Block mode on
ESC C ESC D F	Full-duplex mode on
ESC C ESC D H	Half-duplex mode on
ESC D H ESC B	Half-duplex block mode on
ESC E	Insert line of spaces

Table G-2 Continued

Escape Sequence	Action
ESC F message CR	Program and display computer message on status line
ESC G attr	Assign character display attribute
ESC G lattr	Assign line attribute
ESC H key	Display graphics character
ESC H CTRL B	Graphics mode on
ESC H CTRL C	Graphics mode off
ESC I	Backtab
ESC J	Activate other window/display previous page
ESC K	Activate other window/display next page
ESC L	Print unformatted page
ESC M	Send cursor character
ESC N	Autoscrolling mode off
ESC O	Autoscrolling mode on
ESC P	Print formatted page
ESC Q	Insert space character
ESC R	Delete cursor line
ESC S	Send unprotected characters in block
ESC T	Clear unprotected line to spaces from cursor
ESC U	Monitor mode on
ESC V	Clear cursor column
ESC W	Delete cursor character
ESC X	Monitor mode off
ESC Y	Clear unprotected page to spaces from cursor
ESC Z dir key sequence DEL	Program key direction and definition
ESC Z ~ key	Read key direction and definition
ESC [	
ESC \	
ESC]	Activate upper window
ESC _	
ESC ` scroll	Set scrolling speed and type
ESC ` wpca	Assign write-protected character attribute

Table G-2 Continued

Escape Sequence	Action
ESC ` cursor	Set cursor display features
ESC ` 8	Turn screen display off
ESC ` 9	Turn screen display on
ESC ` :	Select 80-column display
ESC ` ;	Select 132-column display
ESC ` H	Line lock mode on
ESC ` I	Line lock mode off
ESC ` a	Extended status line on
ESC ` b	Standard status line on
ESC ` c	Status line display off
ESC a ll R ccc C	Address cursor in 80/132-column page
ESC b	Read cursor address in 80/132-column current page
ESC c 0 baud stop parity word	Set MODEM port operating parameters
ESC c 1 baud stop parity word	Set AUX port operating parameters
ESC c 2 hndshk	Select MODEM port receive handshaking
ESC c 3 hndshk	Select AUX port receive handshaking
ESC c 4 hndshk	Select MODEM port transmit handshaking
ESC c 5 hndshk	Select AUX port transmit handshaking
ESC c 6 max	Set maximum data transmission speed
ESC c 7 max	Set maximum function key transmission speed
ESC c 8 hh mm	Load time of day
ESC c ? bank	Clear font bank
ESC c @ bank set	Load font bank
ESC c A bank pp bb...bb CTRL Y	Define and load character
ESC c B bank	Define primary character set
ESC c C bank	Define secondary character set
ESC c D	Select primary character set
ESC c E	Select secondary character set

Table G-2 Continued

Escape Sequence	Action
ESC c F _line col char_	Clear unprotected rectangle
ESC c G _line col_	Box rectangle
ESC c H _line col char_	Clear entire rectangle
ESC c I _char_	Clear unprotected column to specific character
ESC c J	Delete cursor column
ESC c K	Clear unprotected column to nulls
ESC c L	Clear unprotected to end of line with nulls
ESC c M	Insert column of nulls
ESC d SPACE	Secondary receive mode off
ESC d !	Secondary receive mode on
ESC d #	Transparent print mode on
ESC d $	Bidirectional mode off
ESC d %	Bidirectional mode on
ESC d &	Begin print/send at top of page
ESC d '	Begin print/send at top of screen
ESC d *	Autopage mode off
ESC d +	Autopage mode on
ESC d .	End-of-line wrap mode off
ESC d /	End-of-line wrap mode on
ESC e "	Page edit mode off
ESC e #	Page edit mode on
ESC e $	Keyclick off
ESC e %	Keyclick on
ESC e &	CAPS LOCK on
ESC e '	CAPS LOCK off
ESC e (	Display 24 data lines
ESC e)	Display 25 data lines
ESC e *	Display 42 data lines
ESC e +	Display 43 data lines
ESC e ,	Key repeat off

Table G-2 Continued

Escape Sequence	Action
ESC e -	Key repeat on
ESC e 0	Character attribute mode off
ESC e 1	Character attribute mode on
ESC e 2	Page attribute mode on
ESC e 3	Line attribute mode on
ESC e 4	Received CR mode off
ESC e 5	Received CR mode on
ESC e 6	ACK mode off
ESC e 7	ACK mode on
ESC e 8	Select MODEM port for data communications
ESC e 9	Select AUX port for data communications
ESC e :	Define SEND key to send line
ESC e ;	Define SEND key to send page
ESC e D	End print/send at cursor
ESC e E	End print/send at end of page/line
ESC e F	Economy 80-column mode off
ESC e G	Economy 80-column mode on
ESC e N	Automatic font loading off
ESC e O	Automatic font loading on
ESC e P	Screen saver off
ESC e Q	Screen saver on
ESC e U	Define CAPS LOCK key as CAPS LOCK
ESC e V	Define CAPS LOCK key as REV
ESC f	
ESC g	
ESC h	
ESC i	Tabulate cursor
ESC j	Move cursor up; scroll
ESC k	Local edit mode on, duplex edit mode off
ESC l	Duplex edit mode on, local edit mode off
ESC m	
ESC n	
ESC o	

Table G-2 Continued

Escape Sequence	Action
ESC p	Print unformatted page
ESC q	Insert mode on, replace mode off
ESC r	Insert mode off, replace mode on
ESC s	Send entire block
ESC t	Clear unprotected line to nulls from cursor
ESC u	Monitor mode off
ESC v	
ESC w length	Divide memory into pages
ESC w page	Display specific page
ESC w B	Display previous page
ESC w C	Display next page
ESC w E	Roll window up in page
ESC w F	Roll window down in page
ESC w @ page line col	Address cursor in 80-column specific page
ESC w `	Read 80-column page/cursor address
ESC x 0	Redefine screen as one window and clear pages
ESC x 1 line	Split screen and clear pages (two pages only)
ESC x 3 line	Split screen and clear pages
ESC x @	Redefine screen as one window
ESC x A line	Split screen (two pages only)
ESC x C line	Split screen
ESC x P	Lower horizontal split
ESC x R	Raise horizontal split
ESC y	Clear unprotected page to nulls from cursor
ESC z fkey sequence DEL	Program function key definition
ESC z key DEL	Clear key definition
ESC z field label CR	Program/display function key label
ESC z field CR	Clear function key label
ESC z (text CR	Program/display unshifted label line
ESC z) text CR	Program shifted label line

Table G-2 Continued

Escape Sequence	Action
ESC z) CR	Clear shifted label line message
ESC z P CR	Display shifted label line
ESC z DEL	Shifted label line off
ESC {	Home cursor
ESC ¦	
ESC }	Activate lower window
ESC ~ SPACE	Enhance mode off
ESC ~ !	Enhance mode on
ESC ~ .	Wyseword mode off
ESC ~ /	Wyseword mode on
ESC ~ 2	Application key mode off
ESC ~ 3	Application key mode on
ESC ~ <u>mode</u>	Select terminal personality
ESC DEL	

APPENDIX H ASCII CODE CONVERSION LISTING

Table H-1 ASCII Code Conversion Listing

ASCII Character	Dec	Hex	ASCII Character	Dec	Hex
NUL	000	00	SP	032	20
SOH	001	01	!	033	21
STX	002	02	"	034	22
ETX	003	03	#	035	23
EOT	004	04	$	036	24
ENQ	005	05	%	037	25
ACK	006	06	&	038	26
BEL	007	07	'	039	27
BS	008	08	(	040	28
HT	009	09	)	041	29
LF	010	0A	*	042	2A
VT	011	0B	+	043	2B
FF	012	0C	,	044	2C
CR	013	0D	-	045	2D
SO	014	0E	.	046	2E
SI	015	0F	/	047	2F
DLE	016	10	0	048	30
DC1	017	11	1	049	31
DC2	018	12	2	050	32
DC3	019	13	3	051	33
DC4	020	14	4	052	34
NAK	021	15	5	053	35
SYN	022	16	6	054	36
ETB	023	17	7	055	37
CAN	024	18	8	056	38
EM	025	19	9	057	39
SUB	026	1A	:	058	3A
ESC	027	1B	;	059	3B
FS	028	1C	<	060	3C
GS	029	1D	=	061	3D
RS	030	1E	>	062	3E
US	031	1F	?	063	3F

Table H-1 Continued

ASCII Char-acter	Dec	Hex	ASCII Char-acter	Dec	Hex
@	064	40	`	096	60
A	065	41	a	097	61
B	066	42	b	098	62
C	067	43	c	099	63
D	068	44	d	100	64
E	069	45	e	101	65
F	070	46	f	102	66
G	071	47	g	103	67
H	072	48	h	104	68
I	073	49	i	105	69
J	074	4A	j	106	6A
K	075	4B	k	107	6B
L	076	4C	l	108	6C
M	077	4D	m	109	6D
N	078	4E	n	110	6E
O	079	4F	o	111	6F
P	080	50	p	112	70
Q	081	51	q	113	71
R	082	52	r	114	72
S	083	53	s	115	73
T	084	54	t	116	74
U	085	55	u	117	75
V	086	56	v	118	76
W	087	57	w	119	77
X	088	58	x	120	78
Y	089	59	y	121	79
Z	090	5A	z	122	7A
[	091	5B	{	123	7B
\	092	5C	¦	124	7C
]	093	5D	}	125	7D
^	094	5E	~	126	7E
_	095	5F	DEL	127	7F

APPENDIX I ASCII LINE AND COLUMN CODES

Table I-1 ASCII Line Codes[1]

Line	Native Code[2]	ADDS VP A2/60[3] DASHER D200 HZ-1500
1	SPACE	CTRL @
2	!	CTRL A
3	"	CTRL B
4	#	CTRL C
5	$	CTRL D
6	%	CTRL E
7	&	CTRL F
8	'	CTRL G
9	(	CTRL H
10	)	CTRL I
11	*	CTRL J
12	+	CTRL K
13	,	CTRL L
14	-	CTRL M
15	.	CTRL N
16	/	CTRL O
17	0	CTRL P
18	1	CTRL Q
19	2	CTRL R
20	3	CTRL S
21	4	CTRL T
22	5	CTRL U
23	6	CTRL V
24	7	CTRL W
25	8	
26	9	
27	:	
28	;	
29	<	
30	=	
31	>	
32	?	
33	@	
34	A	

1. The terminal supports only 24 lines to a page in all compatible modes except WY-50+, PC, and AT modes.
2. Native codes also recognized in WY-50+, PC, AT, ADM 31, IBM 3101, and TeleVideo 910+/920/925/950/955 modes.
3. ADDS Viewpoint codes are for vertical addressing (CTRL K). Absolute cursor addressing (ESC Y) codes are the same as the native mode codes.

Table I-1 Continued

Line	Native Code[2]	Line	Native Code[2]	Line	Native Code[2]
35	B	56	W	77	l
36	C	57	X	78	m
37	D	58	Y	79	n
38	E	59	Z	80	o
39	F	60	[	81	p
40	G	61	\	82	q
41	H	62	]	83	r
42	I	63	^	84	s
43	J	64	_	85	t
44	K	65	`	86	u
45	L	66	a	87	v
46	M	67	b	88	w
47	N	68	c	89	x
48	O	69	d	90	y
49	P	70	e	91	z
50	Q	71	f	92	{
51	R	72	g	93	|
52	S	73	h	94	}
53	T	74	i	95	~
54	U	75	j	96	DEL/RUB
55	V	76	k		

Table I-2 ASCII Column Codes

Column	Native Code[1]	ADDS VP A2/60[2]	DASHER D200	HZ-1500
1	SPACE	CTRL @	CTRL @	CTRL @
2	!	CTRL A	CTRL A	CTRL A
3	"	CTRL B	CTRL B	CTRL B
4	#	CTRL C	CTRL C	CTRL C
5	$	CTRL D	CTRL D	CTRL D
6	%	CTRL E	CTRL E	CTRL E
7	&	CTRL F	CTRL F	CTRL F
8	'	CTRL G	CTRL G	CTRL G
9	(	CTRL H	CTRL H	CTRL H
10	)	CTRL I	CTRL I	CTRL I
11	*	CTRL P	CTRL J	CTRL J
12	+	CTRL Q	CTRL K	CTRL K
13	,	CTRL R	CTRL L	CTRL L
14	-	CTRL S	CTRL M	CTRL M
15	.	CTRL T	CTRL N	CTRL N
16	/	CTRL U	CTRL O	CTRL O
17	0	CTRL V	CTRL P	CTRL P
18	1	CTRL W	CTRL Q	CTRL Q
19	2	CTRL X	CTRL R	CTRL R
20	3	CTRL Y	CTRL S	CTRL S
21	4	SPACE	CTRL T	CTRL T
22	5	!	CTRL U	CTRL U
23	6	"	CTRL V	CTRL V
24	7	#	CTRL W	CTRL W
25	8	$	CTRL X	CTRL X
26	9	%	CTRL Y	CTRL Y
27	:	&	CTRL Z	SPACE

1. Native codes also recognized in WY-50+, PC, AT, ADM 31, IBM 3101, and TeleVideo 910+/920/925/950/955 modes.
2. ADDS Viewpoint codes are for horizontal addressing (CTRL P). Absolute cursor addressing (ESC Y) codes are the same as the native codes.

Table I-2 Continued

Column	Native Code[1]	ADDS VP A2/60[2]	DASHER D200	HZ-1500
28	;	'	CTRL [	!
29	<	(	CTRL \	"
20	=	)	CTRL]	#
31	>	0	CTRL ^	$
32	?	1	CTRL _	%
33	@	2	SPACE	&
34	A	3	!	'
35	B	4	"	(
36	C	5	#	)
37	D	6	$	*
38	E	7	%	+
39	F	8	&	,
40	G	9	'	-
41	H	@	(	.
42	I	A	)	/
43	J	B	*	0
44	K	C	+	1
45	L	D	,	2
46	M	E	-	3
47	N	F	.	4
48	O	G	/	5
49	P	H	0	6
50	Q	I	1	7
51	R	P	2	8
52	S	Q	3	9
53	T	R	4	:
54	U	S	5	;
55	V	T	6	<
56	W	U	7	=
57	X	V	8	>
58	Y	W	9	?
59	Z	X	:	@
60	[	Y	;	A

Table I-2 Continued

Column	Native Code[1]	ADDS VP A2/60[2]	DASHER D200	HZ-1500
61	\	/	<	B
62	]	a	=	C
63	^	b	>	D
64	_	c	?	E
65	`	d	@	F
66	a	e	A	G
67	b	f	B	H
68	c	g	C	I
69	d	h	D	J
70	e	i	E	K
71	f	p	F	L
72	g	q	G	M
73	h	r	H	N
74	i	s	I	O
75	j	t	J	P
76	k	u	K	Q
77	l	v	L	R
78	m	w	M	S
79	n	x	N	T
80	o	y	O	U

APPENDIX J DISPLAY ATTRIBUTES

Table J-1 Character Display Attribute Values

attr	Display Attribute
SPACE	Space character
0	Normal
1	Invisible (no display)
2	Blink
3	Blink and blank
4	Reverse
5	Reverse and invisible
6	Reverse and blink
7	Reverse, blink, and invisible
8	Underline
9	Underline and invisible
:	Underline and blink
;	Underline, blink, and invisible
<	Underline and reverse
=	Underline, reverse, and invisible
>	Underline, reverse, and blink
?	Underline, reverse, blink, and invisible
p	Dim
q	Dim and invisible
r	Dim and blink
s	Dim, blink, and invisible
t	Dim and reverse
u	Dim, reverse, and invisible
v	Dim, reverse, and blink
w	Dim, reverse, blink, and invisible
x	Dim and underline
y	Dim, underline, and invisible

Table J-1 Continued

attr	Display Attribute
z	Dim, underline, and blink
{	Dim, underline, blink, and invisible
¦	Dim, underline, and reverse
}	Dim, underline, reverse, and invisible
`~`	Dim, underline, reverse, and blink
DEL	Dim, underline, reverse, blink, and invisible

Table J-2 Line Attribute Values

lattr	Line Attribute
@	Single-high, single-wide characters (default)
A	Single-high, double-wide characters
B	Top half of double-high, single-wide characters
C	Bottom half of double-high, single-wide characters
D	Top half of double-high, double-wide characters
E	Bottom half of double-high, double-wide characters
G	Normal background
H	Bold background
I	Invisible background (default)
J	Dim background

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References to individual modes and setup parameters are listed under "Modes" and "Parameters" respectively.

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